User's Manual

YTA Series

YTA510
Temperature Transmitter

IM 01C50E01-01EN

vigilantplant®

YOKOGAWA
Yokogawa Electric Corporation

IM 01C50E01-01EN
5th Edition

YTA510
Temperature Transmitter

IM 01C50E01-01EN 5th Edition

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1. Introduction

Thank you for purchasing the YTA temperature transmitter.

Your YTA temperature transmitter was precisely calibrated at the factory before shipment. To ensure both safety and efficiency, please read this manual carefully before you operate the instrument.

NOTE

This manual covers and describes not only for the integral antenna type transmitters but also the detachable antenna ones. Unless otherwise stated, the illustrations in this manual are of the integral antenna type transmitter. Users of the detachable type and specifications should bear in mind that certain features of their instrument will differ from those shown in the illustrations of the integral antenna type.

■ Regarding This Manual

- This manual should be provided to the end user.
- The contents of this manual are subject to change without prior notice.
- All rights reserved. No part of this manual may be reproduced in any form without Yokogawa's written permission.
- Yokogawa makes no warranty of any kind with regard to this manual, including, but not limited to, implied warranty of merchantability and fitness for a particular purpose.
- If any question arises or errors are found, or if any information is missing from this manual, please inform the nearest Yokogawa sales office.
- The specifications covered by this manual are limited to those for the standard type under the specified model number break-down and do not cover custom-made instruments.
- Please note that changes in the specifications, construction, or component parts of the instrument may not immediately be reflected in this manual at the time of change, provided that postponement of revisions will not cause difficulty to the user from a functional or performance standpoint.
- Yokogawa assumes no responsibilities for this product except as stated in the warranty.
- If the customer or any third party is harmed by the use of this product, Yokogawa assumes no responsibility for any such harm owing to any defects in the product which were not predictable, or for any indirect damages.
- The following safety symbols are used in this manual:

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or physical damage. It may also be used to alert against unsafe practices.

IMPORTANT

Indicates that operating the hardware or software in this manner may damage it or lead to system failure.

NOTE

Draws attention to information essential for understanding the operation and features.

1.1 Safe Use of This Product

For the safety of the operator and to protect the instrument and the system, please be sure to follow this manual's safety instructions when handling this instrument. If these instructions are not heeded, the protection provided by this instrument may be impaired. In this case, Yokogawa cannot guarantee that the instrument can be safely operated. Please pay special attention to the following points:

(a) Installation

- This instrument may only be installed by an engineer or technician who has an expert knowledge of this device. Operators are not allowed to carry out installation unless they meet this condition.
- With high process temperatures, care must be taken not to burn yourself by touching the instrument or its casing.
- All installation shall comply with local installation requirements and the local electrical code.

(b) Wiring

- The instrument must be installed by an engineer or technician who has an expert knowledge of this instrument. Operators are not permitted to carry out wiring unless they meet this condition.

(c) Maintenance

- Please carry out only the maintenance procedures described in this manual. If you require further assistance, please contact the nearest Yokogawa office.
- Care should be taken to prevent the build up of dust or other materials on the display glass and the name plate. To clean these surfaces, use a soft, dry cloth.

(d) Explosion Protected Type Instrument

- Users of explosion proof instruments should refer first to section 2.7 (Installation of an Explosion Protected Instrument) of this manual.
- The use of this instrument is restricted to those who have received appropriate training in the device.
- Take care not to create sparks when accessing the instrument or peripheral devices in a hazardous location.
- Repair or modification to this instrument by customer will cause malfunction of explosion protect function and hazardous situation. If you need to repair or modification, please contact the nearest Yokogawa office.

(e) Modification

- Yokogawa will not be liable for malfunctions or damage resulting from any modification made to this instrument by the customer.

1.2 Radio Wave

IMPORTANT

- This instrument is equipped with a wireless module which is designated as a certification of construction type as a wireless facility for 2.4 GHz band low-power data communication system of the Radio Act. Refer to 2.11 “Regulatory Compliance for Radio and Telecommunication” for detail.
- Due to the designated certification of construction type, users may be subject to legal punishment in case of:
  - Disassembling or modifying the wireless module or antenna in this instrument
  - Peeling off the certification label attached to the wireless module in this instrument
- Preventing interference with other wireless stations
  The operating frequency bandwidth of this instrument may overlap the same range as industrial devices, scientific devices, medical devices, microwave ovens, licensed premises radio stations and non-licensed specified low-power radio stations for mobile object identification systems used in factory production lines.
  Before using this instrument, ensure that neither a premises radio station nor specified low power radio station for mobile object identification systems is in use nearby.
  If this instrument causes radio wave interference to a wireless station for mobile object identification systems, promptly change the frequency being used or turn off the source of radio wave emissions.
  Then, contact a Yokogawa office regarding countermeasures to prevent interference, such as setting up partitions.

1.3 Warranty

- The warranty shall cover the period noted on the quotation presented to the purchaser at the time of purchase. Problems occurring during the warranty period shall basically be repaired free of charge.
- If any problems are experienced with this instrument, the customer should contact the Yokogawa representative from which this instrument was purchased or the nearest Yokogawa office.
- If a problem arises with this instrument, please inform us of the nature of the problem and the circumstances under which it developed, including the model specification and serial number. Any diagrams, data and other information you can include in your communication will also be helpful.
- The party responsible for the cost of fixing the problem shall be determined by Yokogawa following an investigation conducted by Yokogawa.

■ **The purchaser shall bear the responsibility for repair costs, even during the warranty period, if the malfunction is due to:**

- Improper and/or inadequate maintenance by the purchaser.
- Malfunction or damage due to a failure to handle, use, or store the instrument in accordance with the design specifications.
- Use of the product in question in a location not conforming to the standards specified by Yokogawa, or due to improper maintenance of the installation location.
- Failure or damage due to modification or repair by any party except Yokogawa or an approved representative of Yokogawa.
- Malfunction or damage from improper relocation of the product in question after delivery.
- Reason of force majeure such as fires, earthquakes, storms/floods, thunder/ lightening, or other natural disasters, or disturbances, riots, warfare, or radioactive contamination.

■ **Trademarks**

In this document, trademarks or registered trademarks are not marked with “™” or “®”. Product names and company names in this document are trademarks or registered trademarks of the respective companies.

1.4 ATEX Documentation

This is only applicable to the countries in European Union.

GB
All instruction manuals for ATEX Ex related products are available in English, German and French. Should you require Ex related instructions in your local language, you are to contact your nearest Yokogawa office or representative.

DK
Alle brugervejledninger for produkter relateret til ATEX Ex er tilgængelige på engelsk, tysk og fransk. Skulle De ønske yderligere oplysninger om håndtering af Ex produkter på eget sprog, kan De rette henvendelse herom til den nærmeste Yokogawa afdeling eller forhandler.

I
Tutti i manuali operativi di prodotti ATEX contrassegnati con Ex sono disponibili in inglese, tedesco e francese. Se si desidera ricevere i manuali operativi di prodotti Ex in lingua locale, mettersi in contatto con l'ufficio Yokogawa più vicino o con un rappresentante.

E
Todos los manuales de instrucciones para los productos antiexplosivos de ATEX están disponibles en inglés, alemán y francés. Si desea solicitar las instrucciones de estos artículos antiexplosivos en su idioma local, deberá ponerse en contacto con la oficina o el representante de Yokogawa más cercano.

NL
Alle handleidingen voor producten die te maken hebben met ATEX explosiebeveiliging (Ex) zijn verkrijgbaar in het Engels, Duits en Frans. Neem, indien u aanwijzingen op het gebied van explosiebeveiliging nodig hebt in uw eigen taal, contact op met de dichtstbijzijnde vestiging van Yokogawa of met een vertegenwoordiger.

SF
Kaikkien ATEX Ex -tyyppisten tuotteiden käyttöhjeet ovat saatavilla englannin-, saksan- ja ranskankielisinä. Mikäli tarvitsette Ex -tyyppisten tuotteiden ohjeita omalla paikallisella kielellännne, ottakaa yhteyttä lähimpään Yokogawa-toimistoon tai -edustajaan.

P
Todos os manuais de instruções referentes aos produtos Ex da ATEX estão disponíveis em Inglês, Alemão e Francês. Se necessitar de instruções na sua língua relacionadas com produtos Ex, deverá entrar em contacto com a delegação mais próxima ou com um representante da Yokogawa.

F
Tous les manuels d'instruction des produits ATEX Ex sont disponibles en langue anglaise, allemande et française. Si vous nécessitez des instructions relatives aux produits Ex dans votre langue, veuillez bien contacter votre représentant Yokogawa le plus proche.

D
Alle Betriebsanleitungen für ATEX Ex bezogene Produkte stehen in den Sprachen Englisch, Deutsch und Französisch zur Verfügung. Sollten Sie die Betriebsanleitungen für Ex-Produkte in Ihrer Landessprache benötigen, setzen Sie sich bitte mit Ihrem örtlichen Yokogawa-Vertreter in Verbindung.

S
Alla instruktionsböcker för ATEX Ex (explosionssäkra) produkter är tillgängliga på engelska, tyska och franska. Om Ni behöver instruktioner för dessa explosionssäkra produkter på annat språk, skall Ni kontakta närmaste Yokogawakontor eller representant.

GR
Όλα τα εγχειρίδια λειτουργίας των προϊόντων με ATEX Ex διατίθενται στα Αγγλικά, Γερμανικά και Γαλλικά. Σε περίπτωση που χρειάζεστε οδηγίες σχετικά με Ex στην τοπική γλώσσα παρακαλούμε επικοινωνήστε με το πλησιέστερο γραφείο της Yokogawa ή αντιπρόσωπο της.

SK
Všetky návody na obsluhu pre prístroje s ATEX Ex sú k dispozícii v jazyku anglickom, nemeckom a francúzskom. V prípade potreby návodu pre Ex-prístroje vo Vašom národnom jazyku, skontaktujte prosím miestnu kanceláriu firmy Yokogawa.

CZ
Všechny uživatelské příručky pro výrobky, na něž se vztahuje nevýbušné schválení ATEX Ex, jsou dostupné v angličtině, němčině a francouzštině. Požadujete-li pokyny týkající se výrobků s nevýbušným schválením ve vašem lokálním jazyku, kontaktujte prosím vaši nejbližší reprezentační kancelář Yokogawa.

LT
Visos gaminiø ATEX Ex kategorijos Eksploatavimo instrukcijos teikiami anglø, vokieèiø ir prancûzø kalbomis. Norëdami gauti prietaisø Ex dokumentacijà kitomis kalbomis susisiekite su artimiausiu bendrovës "Yokogawa" biuru arba atstovu.

LV
Visas ATEX Ex kategorijas izstrâdâjumu Lietoðanas instrukcijas tiek piegâdâtas angïu, vâcu un franèu valodâs. Ja vçlaties saòemt Ex ierîèu dokumentâciju citâ valodâ, Jums ir jâsazinâs ar firmas Jokogava (Yokogawa) tuvâko ofisu vai pârstâvi.

EST
Kõik ATEX Ex toodete kasutamisjuhendid on esitatud inglise, saksa ja prantsuse keeles. Ex seadmete muukeelse dokumentatsiooni saamiseks pöörduge lähima lokagava (Yokogawa) kontori või esindaja poole.

PL
Wszystkie instrukcje obsługi dla urządzeń w wykonaniu przeciwwybuchowym Ex, zgodnych z wymaganiami ATEX, dostępne są w języku angielskim, niemieckim i francuskim. Jeżeli wymagana jest instrukcja. obsługi w Państwa lokalnym ję zyku, prosimy o kontakt z najbliższym biurem Yokogawy.

SLO
Vsi predpisi in navodila za ATEX Ex sorodni pridelki so pri roki v angliščini, nemščini ter francoščini. Če so Ex sorodna navodila potrebna v vašem tukejnjem jeziku, kontaktirajte vaš najbliši Yokogawa office ili predstaunika.

H
Az ATEX Ex mûszerek gépkönyveit angol, német és francia nyelven adjuk ki. Amennyiben helyi nyelven kérik az Ex eszközök leírásait, kérjük keressék fel a legközelebbi Yokogawa irodát, vagy képviseletet.

BG
Всички упътвания за продукти от серията ATEX Ex се предлагат на английски, немски и френски език. Ако се нуждаете от упътвания за продукти от серията Ex на родния ви език, се свържете с най-близкия офис или представителство на фирма Yokogawa.

RO
Toate manualele de instructiuni pentru produsele ATEX Ex sunt in limba engleza, germana si franceza. In cazul in care doriti instructiunile in limba locala, trebuie sa contactati cel mai apropiat birou sau reprezentant Yokogawa.

M
Il-manwali kollha ta' l-istruzzjonijiet għal prodotti marbuta ma' ATEX Ex huma disponibbli bl-Ingliż, bil-Ġermaniż u bil-Franċiż. Jekk tkun teħtieġ struzzjonijiet marbuta ma' Ex fil-lingwa lokali tiegħek, għandek tikkuntattja lill-eqreb rappreżentan jew uffiċċju ta' Yokogawa.

2. Notes on Handling

The YTA temperature transmitter is fully factory-tested upon shipment. When the YTA is delivered, check the appearance for damage, and also check that the transmitter mounting parts shown in Figure 2.1 are included with your shipment. If "No Mounting Bracket" is indicated, no transmitter mounting bracket is included.

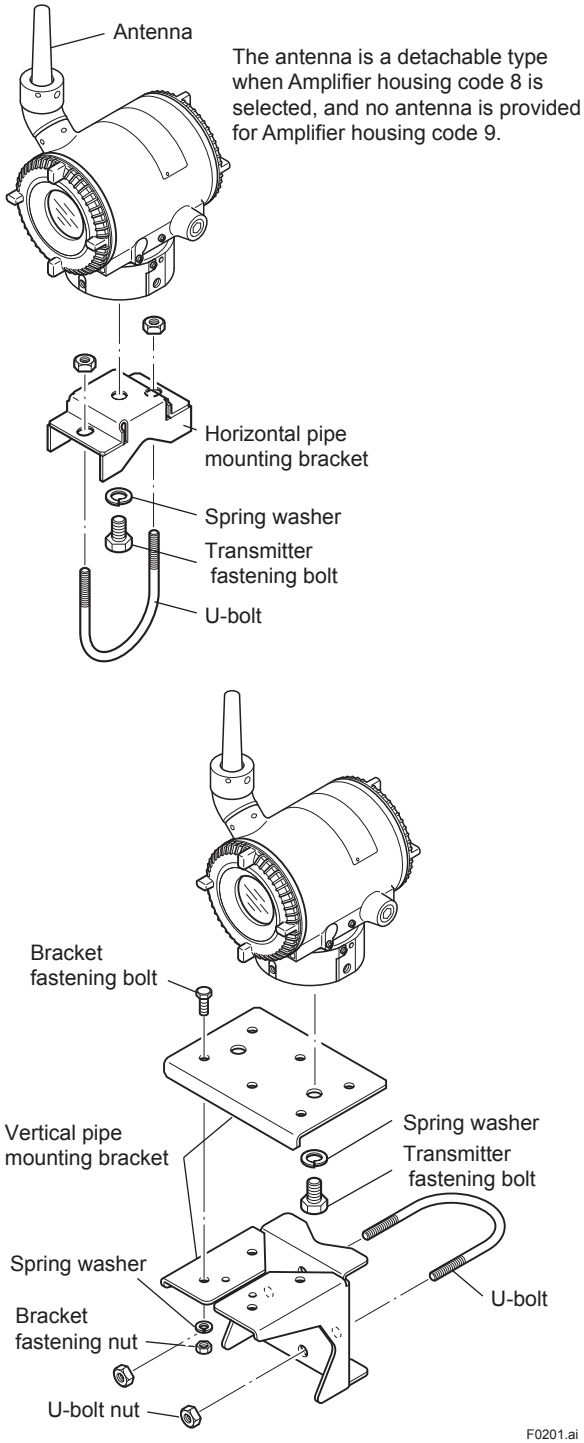


Figure 2.1 Transmitter Mounting Hardware

2.1 Check the Model Name and configuration

The model name and configuration are indicated on the nameplate. Verify that the configuration indicated in the "Model and Suffix Code" in Chapter 10 is in compliance with the specifications written on the order sheet.

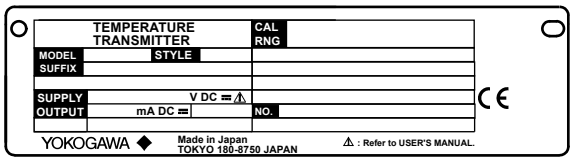


Figure 2.2 Name Plate

2.2 Transport

To prevent damage while in transit, leave the transmitter in the original shipping container until it reaches the installation site.

2.3 Storage

When an extended storage period is expected, observe the following precautions.

1. Choose a storage location that satisfies the following requirements.
   - A location that is not exposed to rain or water.
   - A location subject to a minimum of vibration or impact.
   - The following temperature and humidity range is recommended. Ordinary temperature and humidity (25°C, 65%) are preferable.
     Temperature: –40 to 85°C
     –30 to 80°C (LCD visible range)
     Humidity: 5 to 100% RH (at 40°C)
2. If at all possible, store the transmitter in factory-shipped condition, that is, in the original shipping container.
3. Preferably remove the batteries for storage. For maximum battery life, the storage temperature should not exceed 30°C

NOTE

When storing the instrument with a battery pack, it is recommended to put the instrument in Deep Sleep mode to conserve the batteries. For details on how to switch to Deep Sleep mode, refer to subsection 7.3.14 “Switching to the Deep Sleep Mode”.

2.4 Choosing the Installation Location

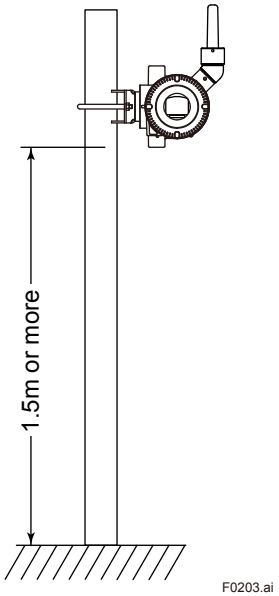
Although the temperature transmitter is designed to operate in a vigorous environment, to maintain stability and accuracy, the following is recommended.

■ Wireless Communication

NOTE

The installation location of this transmitter must meet the following conditions:

- Adjust the direction of the antenna to be in the upright position regardless of the orientation of this transmitter. See section 4 for adjusting the antenna.
- Install the transmitter at least 1.5 m above the ground or floor.



- Ensure that there are no obstacles such as walls or pipes within a 30-cm radius of each antenna.
- Confirm that each field wireless equipment compliant with ISA100.11a can see the antenna of other devices which locate within its own communication range. In the star topology network, the visibility to the antenna of gateway is a mandatory clause.

■ Ambient Temperature

It is preferable to not to expose the instrument to extreme temperatures or temperature fluctuations. If the instrument is exposed to radiation heat a thermal protection system and appropriate ventilation is recommended.

■ Environmental Requirements

Do not allow the instrument to be installed in a location that is exposed to corrosive atmospheric conditions. When using the instrument in a corrosive environment, ensure the location is well ventilated.

The unit and its wiring should be protected from exposure to rainwater.

■ Impact and Vibration

It is recommended that the instrument be installed in a location that is subject to a minimum amount of impact and vibration.

■ Installation of Explosion-protected Transmitters

An explosion-protected transmitters is certified for installation in a hazardous area containing specific gas types. See subsection 2.7 “Installation of an Explosion-Protected Transmitters.

2.5 Use of a Transceiver

IMPORTANT

Although the transmitter has been designed to resist high frequency electrical noise, if a radio transceiver is used near the transmitter or its external wiring, the transmitter may be affected by high frequency noise pickup. To test this, start out from a distance of several meters and slowly approach the transmitter with the transceiver while observing the measurement loop for noise effects. Thereafter use the transceiver outside the range where the noise effects were first observed.

2.6 Insulation Resistance Test and Withstand Voltage Test

(1) Overvoltage of the test voltage that is so small that it does not cause an dielectric breakdown may in fact deteriorate insulation and lower the safety performance; to prevent this it is recommended that the amount of testing be kept to a minimum.
(2) The voltage for the insulation resistance test must be 500 VDC or lower, and the voltage for the withstand voltage test must be 500 VAC (50Hz ~ 60Hz) or lower. Failure to heed these guidelines may cause faulty operation.
(3) Follow the steps below to perform the test.

■ **Insulation resistance test procedure**

1) Remove the battery pack. See subsection 8.4.4 for details on how to remove it.
2) Lay wiring across sensor terminals in the terminal box.
3) Turn OFF the insulation tester. Then connect the insulation tester plus (+) lead wire to the shorted battery connection terminals and the minus (-) lead wire to the grounding terminal.
4) Turn ON the insulation tester power and measure the insulation resistance. The voltage should be applied as briefly as possible to verify that the insulation resistance is at least 100 MΩ.
5) After completing the test and being very careful not to touch exposed conductors disconnect the insulation tester and connect a 100 kΩ resistor between the grounding terminal and the short-circuiting battery connection terminals. Leave this resistor connected at least one second to discharge any static potential. Do not touch the terminals while it is discharging.

NOTE

When storing the instrument with a battery pack, it is recommended to put the instrument in Deep Sleep mode to conserve the batteries. For details on how to switch to Deep Sleep mode, refer to subsection 7.3.14 "Switching to Deep the Sleep Mode".

■ **Withstand voltage test procedure**

1) Remove the battery pack. See subsection 8.4.4 for details on how to remove it.
2) Lay wiring across sensor terminals in the terminal box.
3) Turn OFF the dielectric strength tester. Then connect the tester between the shorted battery connection terminals and the grounding terminal. Be sure to connect the grounding lead of the dielectric strength tester to the ground terminal.
4) Set the current limit on the dielectric strength tester to 10 mA, then turn ON the power and gradually increase the test voltage from '0' to the specified voltage.
5) When the specified voltage is reached, hold it for one minute.
6) After completing this test, slowly decrease the voltage to avoid any voltage surges.

NOTE

When storing the instrument with a battery pack, it is recommended to put the instrument in Deep Sleep mode to conserve the batteries. For details on how to switch to Deep Sleep mode, refer to subsection 7.3.14 "Switching to Deep the Sleep Mode".

2.7 Installation of an Explosion-Protected Instrument

If a customer makes a repair or modification to an intrinsically safe instrument and the instrument is not restored to its original condition, its intrinsically safe construction may be compromised and the instrument may be hazardous to operate. Please contact Yokogawa before making any repair or modification to an instrument.

CAUTION

This instrument has been tested and certified as being intrinsically safe. Please note that severe restrictions apply to this instrument's construction, installation, external wiring, Maintenance and repair. A failure to abide by these restrictions could make the instrument a hazard to operate.

2.7.1 FM Approval

Caution for FM intrinsically safe type. (Following contents refer “DOC. No. IFM038-A20”)

Note 1. Model YTA Series temperature transmitters with optional code /FS17 are applicable for use in hazardous locations.

- Applicable Standard: FM3600, FM3610, FM3611, FM3810, ANSI/NEMA 250
- Intrinsically Safe for Class I, Division 1, Groups A, B, C & D. Class II, Division 1, Groups E, F & G and Class III, Division1, Class I, Zone 0 in Hazardous Locations, AEx ia IIC
- Nonincendive for Class I, Division 2, Groups A, B, C & D. Class II, Division 2, Groups F & G and Class III, Division 1, Class I, Zone 2, Groups IIC, in Hazardous Locations.
- Enclosure: NEMA 4X (Indoors and outdoors)
- Temperature Class: T4
- Ambient temperature: –50 to 70°C

Note 2. Output Parameters

- Sensor Circuit (1 to 5)
  Voc: 6.6 V
  Isc: 48 mA
  Po: 78 mW
  Ca: 5 µF
  La: 30 mH
- For the sensor input circuitry, these entity parameters must be taken into account when installed.
- Installation Requirements between temperature transmitter and sensor:
  Voc ≤ Vsi, Isc ≤ Isi, Po ≤ Psi
  Ca ≥ Co + Ccable, La ≥Lo + Lcable

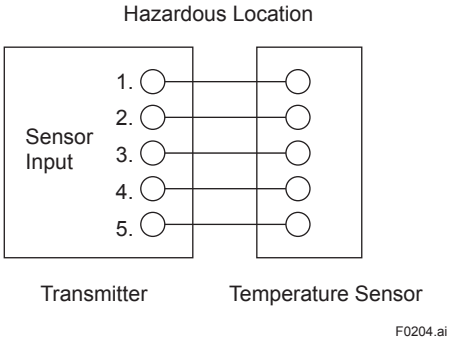
  Vsi, Isi, Psi, Co and Lo are parameters of the sensor.
- Wiring for Nonincendive according to Nonincendive field wiring standard.

Note 3. Installation

- Installation should be in accordance with ANSI/ISA RP12.6 “Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations” and the National Electric Code (ANSI/NFPA 70).
- Dust-tight conduit seal must be used when installed in a Class II, III, Group E, F and G environments.
- Note a warning label worded “SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY,” and “INSTALL IN ACCORDANCE WITH DOC. No. IFM038-A20”.

Note 4. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Factory Mutual Intrinsically safe and Nonincendive Approval.



Note 5. Battery Pack
Use only YOKOGAWA battery pack F9915MA.

Note 6. Special Conditions for safe use
Potential electrostatic charging hazard-secure distance of 100mm from antenna. Do not open when CL II, III, DIV 1,2 atmosphere is present.

2.7.2 CSA Certification

Caution for CSA intrinsically safe type. (Following contents refer “DOC. No. ICS031)

Note 1. Model YTA Series temperature transmitters with optional code /CS17 are applicable for use in hazardous locations.
Certificate: 2328785
[For CSA C22.2]

- Applicable Standard: C22.2 No.0, C22.2 No.0.4, C22.2 No.25, C22.2 No.94, C22.2 No.157, C22.2 No.213, C22.2 No.61010-1
- Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G, Class III, Division 1
- Nonincendive for Class I, Division 2, Groups A, B, C&D, Class II, Division 2, Groups F&G, Class III, Division 1
- Enclosure: Type 4X,
- Temp. Code: T4
- Amb. Temp.: –50 to 70°C

[For CSA E60079]

- Applicable Standard: CAN/CSA E60079-0, CAN/CSA E60079-11, IEC 60529 Edition 2.1: 2001-02
- Ex ia IIC T4
- Ambient Temperature: –50 to 70°C
- Enclosure: IP66 and 67

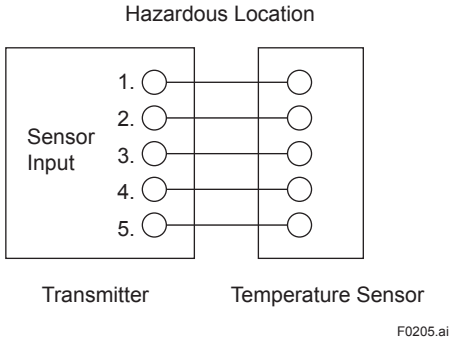
Note 2. Entity Parameters

- Intrinsically Safe Apparatus Parameters [Groups A, B, C, D, E, F and G]
  Uo = 6.6 V, Io = 48 mA,
  Po = 78 mW, Co = 5 µF,
  Lo = 30 mH
- Installation Requirements between temperature transmitter and sensor:
  Uo ≤ Vs, Io ≤ Is, Po ≤ Ps
  Co ≥ Ca + Ccable, Lo ≥La + Lcable

Vs, Is, Ps, Ca and La are parameters of the sensor.

Note 3. Installation

- Installation should be in accordance with Canadian Electrical Code Part I and Local Electrical Code.
- The Hand Held Terminal must be CSA certified.
- Do not alter drawing without authorization from CSA.
- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation of America is prohibited and will void Canadian Standards Intrinsically safe and nonincendive Certification.



Note 4. Battery Pack
Use only YOKOGAWA battery pack F9915MA.

Note 5. Special Conditions for safe use
Potential electrostatic charging hazard-secure distance of 100mm from antenna.
Do not open when CL II, III, DIV 1,2 atmosphere is present.

2.7.3 ATEX Certification

(1) Technical Data

Caution for ATEX Intrinsically safe type.(Following contents refer to “Doc No. IKE038”)

Note 1. Model YTA Series temperature transmitters with optional code /KS27 for potentially explosive atmospheres:

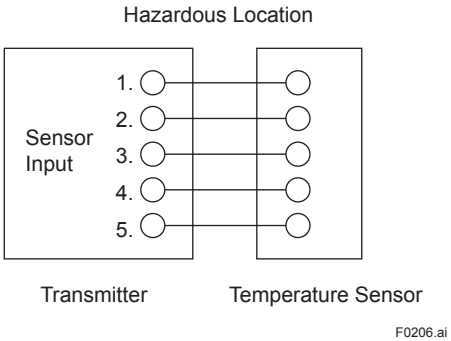
- No. KEMA 10ATEX0163 X
- Applicable Standard:
  EN 60079-0:2009, EN 60079-11:2007,
  EN 60079-26:2007
- Type of Protection and Marking code:
  Ex ia IIC T4 Ga
- Group: II
- Category: 1G
- Ambient Temperature: –50°C to 70°C
- Enclosure: IP66 and IP67

Note 2. Output Parameters

- Sensor input circuit (Terminals 1 to 5)
  Uo: 6.6 V
  Io: 48 mA
  Po: 78 mW
  Co: 5 µF
  Lo: 30 mH
- For the sensor input circuitry, these entity parameters must be taken into account when installed.
- Installation requirements between temperature transmitter and sensor:
  Uo ≤ Vs, Io ≤ Is, Po ≤ Ps
  Co ≥ Ca + Ccable, Lo ≥La + Lcable
  Vs, Is, Ps, Ca and La are parameters of the sensor input.

Note 3. Installation

- Installation should be in accordance with local installation requirements. (Refer to the installation diagram)



Note 4. Battery Pack

- Use only YOKOGAWA battery pack F9915MA.

Note 5. Special conditions for Safe Use

- In the case where the enclosure of the temperature Transmitter is made of aluminium, if it is mounted in an area where the use of category 1 G apparatus is required, it must be installed such, that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
- Avoid any actions that cause the generation of electrostatic charge on the non-metallic parts, such as rubbing with a dry cloth on coating face of product.

WARNING

Potential electrostatic charging hazard - secure distance of 100mm from antenna.

(2) Operation

WARNING

Take care not to generate mechanical sparking when access to the instrument and peripheral devices in a hazardous location.

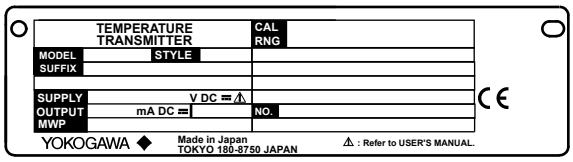
(3) Maintenance and repair

WARNING

The instrument modification or parts replacement by other than an authorized Representative of Yokogawa Electric Corporation is prohibited and will void the certification.

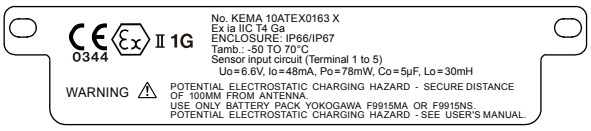
(4) Name Plate

- Name Plate



F0207.ai

- Tag plate for intrinsically safe type


0344
II 1G
No. KEMA 10ATEX0163 X
Ex ia IIC T4 Ga
ENCLOSURE: IP66/IP67
Tamb.: -50 TO 70°C
Sensor input circuit (Terminal 1 to 5)
Uo=6.6V, Io=48mA, Po=78mW, Co=5μF, Lo=30mH
WARNING
POTENTIAL ELECTROSTATIC CHARGING HAZARD - SECURE DISTANCE OF 100MM FROM ANTENNA.
USE ONLY BATTERY PACK YOKOGAWA F9915MA OR F9915NS.
POTENTIAL ELECTROSTATIC CHARGING HAZARD - SEE USER'S MANUAL.

F0208.ai

MODEL: Specified model code.
SUFFIX: Specified suffix code.
STYLE: Style code.
SUPPLY: Supply voltage.
OUTPUT: Output signal.
CAL RNG: Calibration range.
NO.: Serial number and year of production *1.
TOKYO 180-8750 JAPAN: The manufacturer name and the address *2.

*1: The first digit in the final three numbers of the serial number appearing after "NO." on the nameplate indicates the year of production. The following is an example of a serial number for a product that was produced in 2010:

91K819857 032

↑

The year 2010

*2: "180-8750" is a zip code which represents the following address.

2-9-32 Nakacho, Musashino-shi, Tokyo Japan

2.7.4 IECEx Certification

Caution for IECEx Intrinsically safe type.
(Following contents refer to “Doc No. IKE038”)

Note 1. Model YTA Series temperature transmitters with optional code /SS27 for potentially explosive atmospheres:

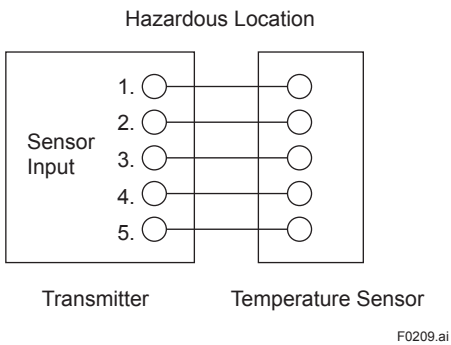
- No. IECEx KEM 10.0073X
- Applicable Standard:
  IEC 60079-0: 2007-10, IEC 60079-11: 2006,
  IEC 60079-26: 2006
- Type of Protection and Marking code:
  Ex ia IIC T4 Ga
- Ambient Temperature: –50°C to 70°C
- Enclosure: IP66 and IP67

Note 2. Output Parameters

- Sensor input circuit (Terminals 1 to 5)
  Uo: 6.6 V
  Io: 48 mA
  Po: 78 mW
  Co: 5 µF
  Lo: 30 mH
- For the sensor input circuitry, these entity parameters must be taken into account when installed.
- Installation requirements between temperature transmitter and sensor:
  Uo ≤ Vs, Io ≤ Is, Po ≤ Ps
  Co ≥ Ca + Ccable, Lo ≥La + Lcable
  Vs, Is, Ps, Ca and La are parameters of the sensor input.

Note 3. Installation

- Installation should be in accordance with local installation requirements.
  (Refer to the installation diagram)



Note 4. Maintenance and Repair

WARNING

The instrument modification or parts replacement by other than an authorized Representative of Yokogawa Electric Corporation is prohibited and will void IECEx Intrinsically safe Certification.

Note 5. Battery Pack

- Use only YOKOGAWA battery pack F9915MA.

Note 6. Special conditions for Safe Use

- In the case where the enclosure of the Temperature Transmitter is made of aluminium, if it is mounted in zone 0, it must be installed such, that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
- Avoid any actions that cause the generation of electrostatic charge such as rubbing with a dry cloth on coating face of product.

WARNING

- Potential electrostatic charging hazard - secure distance of 100mm from antenna.
- Take care not to generate mechanical sparking when access to the instrument and peripheral devices in a hazardous location.

2.8 EMC Conformity Standards

EN61326-1 Class A, Table 2 (For use in industrial locations), EN61326-2-3

CAUTION

This instrument is a Class A product, and it is designed for use in the industrial environment. Please use this instrument in the industrial environment only.

WARNING

The potential for discharging static electricity should be minimized in mounting this transmitter. For example, do not generate static electricity as the surface of a battery pack or housing is rubbed with cloth.

2.9 Low Voltage Directive

Applicable standard: EN61010-1

(1) Pollution Degree 2

"Pollution degree" describes the degree to which a solid, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering. " 2 " applies to normal indoor atmosphere. Normally, only non-conductive pollution occurs. Occasionally, however, temporary conductivity caused by condensation must be expected.

(2) Installation Category I

"Overvoltage category (Installation category)" describes a number which defines a transient overvoltage condition. It implies the regulation for impulse withstand voltage. " I " applies to electrical equipment which is supplied from the circuit when appropriate transient overvoltage control means (interfaces) are provided.

2.10 Regulatory Compliance for Radio and Telecommunication

Please confirm that a installation region fulfills a standards, require additional regulatory information and approvals, contact to Yokogawa Electric Corporation.

2.11 Radio and Telecommunications Terminal Equipment Directive (R&TTE)

We, Yokogawa Electric Corporation hereby declare that this equipment,model YTA510 series is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

The CE declaration of conformity for R&TTE for this product can be found at http://www.yokogawa.com/fld/

NOTE

France restricts outdoor use to 10mW (10dBm) EIRP in the frequency range of 2,454 - 2,483.5MHz. Installation in France must configure the network with configuration tool not to use channel 10 to 14. To configure the network, refer to IM 01W01F01-01EN.

2.12 FCC compliance

This device complies with Part 15 of FCCRules. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this devicemust accept any interference, including interference that may cause undesired operation of this device.

Co-located:

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

FCC WARNING:

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE

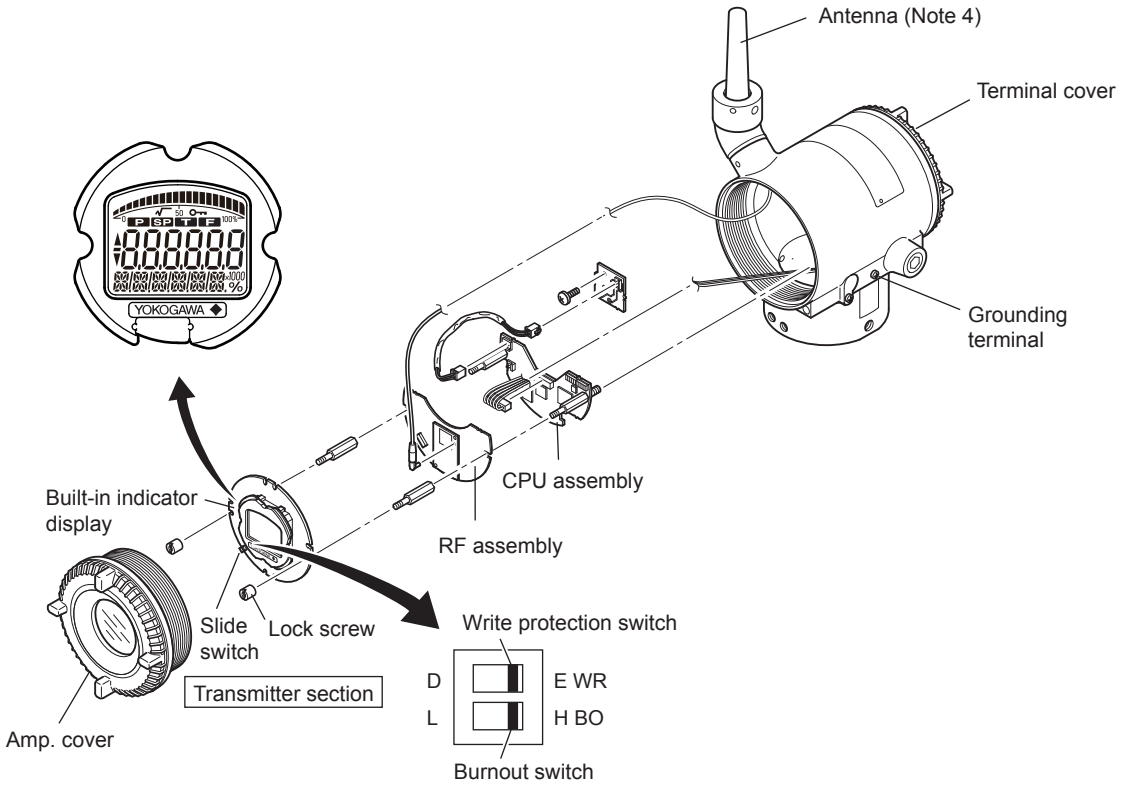
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of he FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual,may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

2.13 Industry Canada (IC) compliance

This Class A digital apparatus complies with Canadian ICES-003. French:Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

3. Part Names and Functions



Hardware write protection switch (WR)		
Write Protection Switch Position (Note1)	D L E H	D L E H
Write Protection	No (Write enabled)	Yes (Note2) (Write disabled)

Burnout switch (BO)		
Burnout Switch Position (Note3)	D L E H	D L E H
Burnout	HIGH	LOW

F0301.ai

Note 1: Set the switch as shown in the figure above to set the write protection. The hardware write protection switch is set to E side (writable).
Note 2: When the switch is D side (write protection setting), provisioning is acceptable. For details of provisioning, refer to section 6.4 " Connecting to the Field Wireless Network "
Note 3: Set the switch as shown in the figure above to set the burnout. The burnout switch is set to H side (HIGH).
For the integral antenna type, a burnout direction can be set by paramter setting. See subsection 7.3.11 Burnout Setting.
Note 4: For Amplifier housing code 8 and 9, the antenaa is a detachable type.

Figure 3.1 Component Names

Table 3.1 Display Symbol

Display Symbol	Meaning of Display Symbol
⚷	Write protect function is enabled.

4. Installation

4.1 Precautions

- Before installing the transmitter, read the cautionary notes in section 2.4, “Selecting the Installation Location.”
- For additional information on the ambient conditions allowed at the installation location, refer to subsection 10 “General Specifications.”

NOTE

To connect this transmitter to the Field Wireless Network, information for connecting to the field wireless devices needs to be set beforehand. Refer to subsection 6.4 “Connecting to the Field Wireless Network.”

IMPORTANT

- When performing on-site pipe fitting work that involves welding, use care to prevent outflow of the welding current into the transmitter.
- Do not use the transmitter as a foothold for installation.

4.2 Mounting

- The mounting bracket shown in Figure 4.1 is used for the transmitter and is installed on 50A (2-inch) pipe. It can be installed either on a horizontal pipe and a vertical pipe or on a wall.
- To install the mounting bracket on the transmitter, torque the transmitter fastening bolt (1) to about 20 to 30 N m.

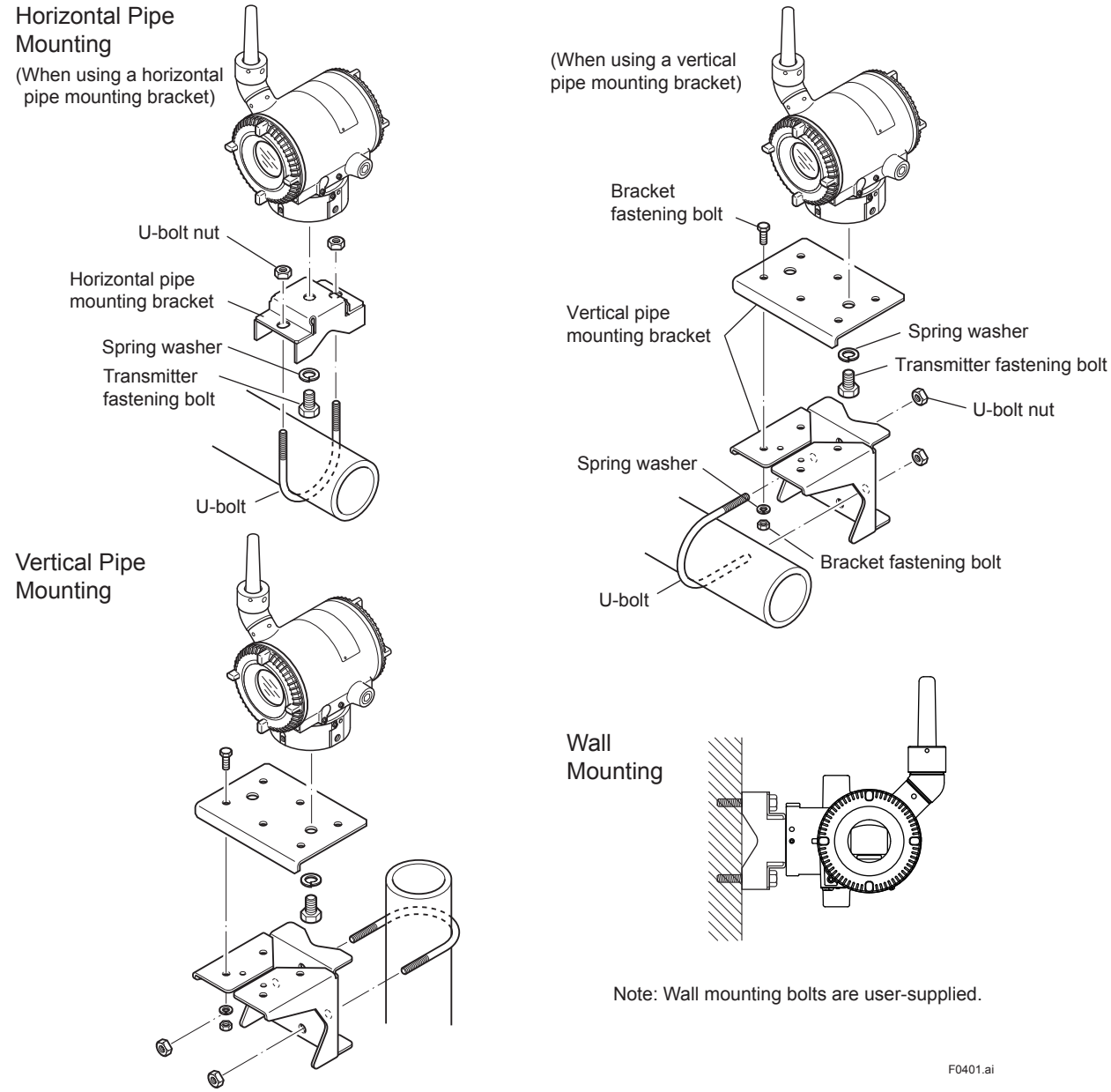


Figure 4.1 Transmitter Mounting

4.3 Changing the Direction of Integral Indicator

IMPORTANT

Always turn OFF power, remove a transmitter to non-hazardous area before disassembling and reassmbling an indicator.

An integral indicator can be rotated in four positions at 90°. Follow the instructions in section 8.4.1 for removing and attaching the integral indicator.

4.4 Changing the Direction of the Antenna

Adjust the direction of the antenna to be in the upright position. The direction of antenna is like Figure 4.2 at the factory setting.

When adjust the electrical connection vertically, change the direction of the antenna.

To change the installation angle, follow the procedure below.

1) Loosen the two mounting screws at the bottom of the antenna by using a 2.5 mm Allen wrench (see Figure 4.2).
   The screws might come off and be lost if loosened too much; loosen the screws by about three rotations.
2) Press forward and down 90 degrees by rotating the axis at the bottom of the antenna.
3) Tighten the two screws to a torque of 1.5 N·m by using a torque wrench. When doing this, be careful not leave a gap between the antenna and housing.

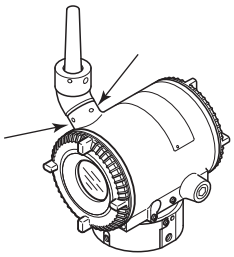


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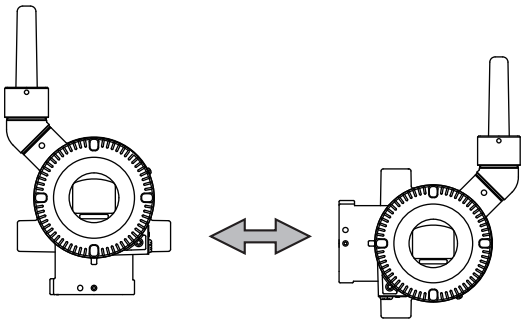
Figure 4.2 Mounting Screw Position



F0403.ai

Figure 4.3 Adjusting Antenna Position

5. Wiring

5.1 Notes on Wiring

IMPORTANT

- Apply a waterproofing sealant to the threads of the connection port. (It is recommended that you use non-hardening sealant made of silicon resin for waterproofing.)
- Lay wiring as far away as possible from electrical noise sources such as large transformers, motors and power supplies.
- Remove the wiring connection dust-caps before wiring.
- To prevent electrical noise, the signal cable and the power cable must not be housed in the same conduit.

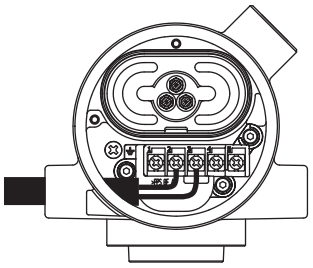
5.2 Cable Selection

A dedicated cable is used for connection between the temperature sensor and the temperature transmitter.

When a thermocouple is used as the temperature sensor, a compensation wire that is appropriate for the type of thermocouple (refer to compensating cables for IEC584-3 thermocouples) must be used. When a resistance temperature sensor (RTD) is used as the temperature sensor, 2-core/3-core/4-core cable must be used (refer to resistance thermometer sensor IEC751). In a place where the cable will be susceptible to the effect of noise, a shielded cable must be used.

The terminal of the dedicated cable is a 4 mm screw.

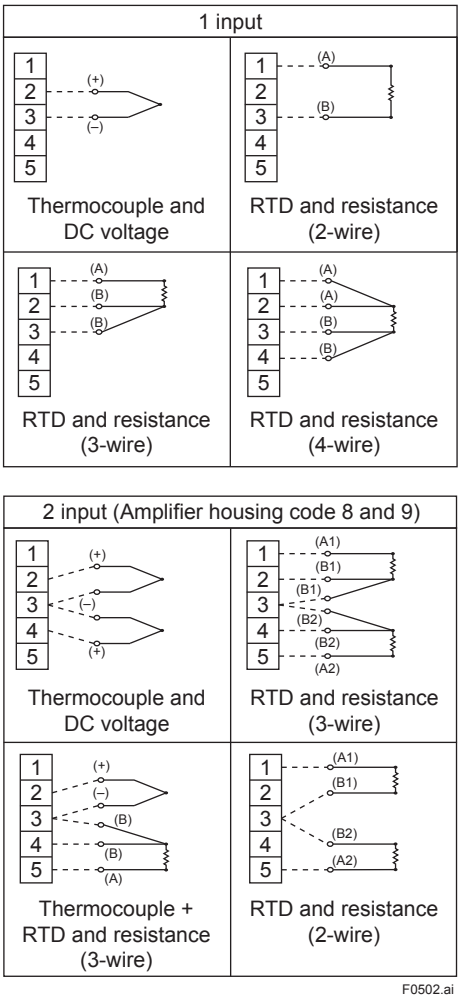
5.3 Cable and Terminal Connections



F0501.ai

Figure 5.1 Input Terminal Connections

The temperature sensor is to be connected as shown in Figures 5.2.


1 input
Thermocouple and DC voltage
RTD and resistance (2-wire)
RTD and resistance (3-wire)
RTD and resistance (4-wire)
2 input (Amplifier housing code 8 and 9)
Thermocouple and DC voltage
RTD and resistance (3-wire)
Thermocouple + RTD and resistance (3-wire)
RTD and resistance (2-wire)

F0502.ai

Figure 5.2 YTA510 Input Terminal Wire Connection Diagram

5.4 Wiring Cautions

Use metal conduit wiring or a waterproof gland (metal wiring conduit JIS F 8801) for cable wiring.

- Apply non-hardening sealant to the threads of the wiring tap and a flexible fitting for secure waterproofing.

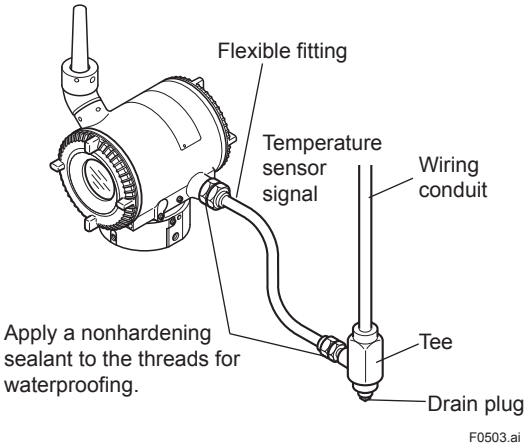


Figure 5.3 Example of Wiring Using a Wiring Conduit

5.5 Mounting Antenna and Wiring

For Amplifier housing code 8 and 9, an antenna is not attached to the transmitter. The following provides the instructions for mounting the antenna and installing the remote antenna and wiring using antenna extension cable.

IMPORTANT

The antenna connector is covered with a cap at the time of delivery. Keep the cap attached until the installation of the antenna or antenna cables to protect the inside connection part. The unscrewed cap should be stored in order to replace it immediately after the antenna or antenna cables are removed.

CAUTION

To maintain the ultimate conditions of radio-frequency signal, protect the connectors of antenna, extension antenna cable, and arrester from the corrosive atmosphere by the following treatment.

1. Clean the connection to be protected.
2. Wind the butyl rubber self-bonding tape around the connection. See the manual of the tape about the winding.
3. To protect the butyl rubber self-bonding tape from the environment such as ultraviolet rays and so on, wind vinyl tape (or a vinyl type self-bonding tape) on it.

5.5.1 Mounting the Antenna

Screw the provided antenna into the antenna connector of the transmitter. The antenna may be sold as available accessories and supplied separately.

1. Unscrew the antenna connector cap on the antenna connector.
2. Screw the provided antenna into the antenna connector. Tighten the antenna connector with a torque of 2 to 3 N•m.

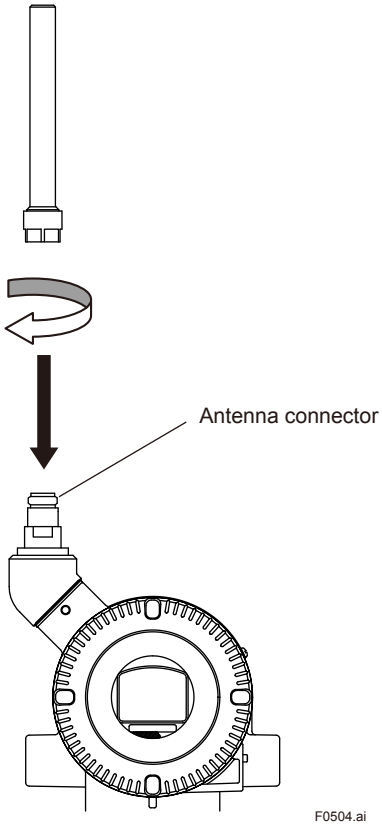


Figure 5.4 Mounting the Antenna

CAUTION

When installing the antenna, screw the antenna by tightening the lower nut part. Screwing the antenna by holding the antenna body may cause failure such as cable disconnection. The same manner should be taken when unscrewing the antenna.

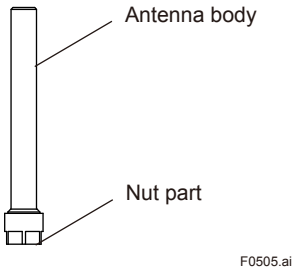


Figure 5.5 Antenna

5.5.2 Mounting External Antenna and Wiring Antenna Extension Cable

5.5.2.1 Mounting of External Antenna

Mount the external antenna at the proper location according to the wireless environment described in 2.4 Selecting the Installation Location. The mounting to the pipe such as 50 mm (2-inch) pipe needs to secure the enough strength to endure a strong wind, vibration and so on. The antenna must be mounted vertically.

■ **Fixing of External Antenna**

Fix an external antenna appropriately using the bracket provided as the external antenna option to 50 mm (2-inch) pipe.

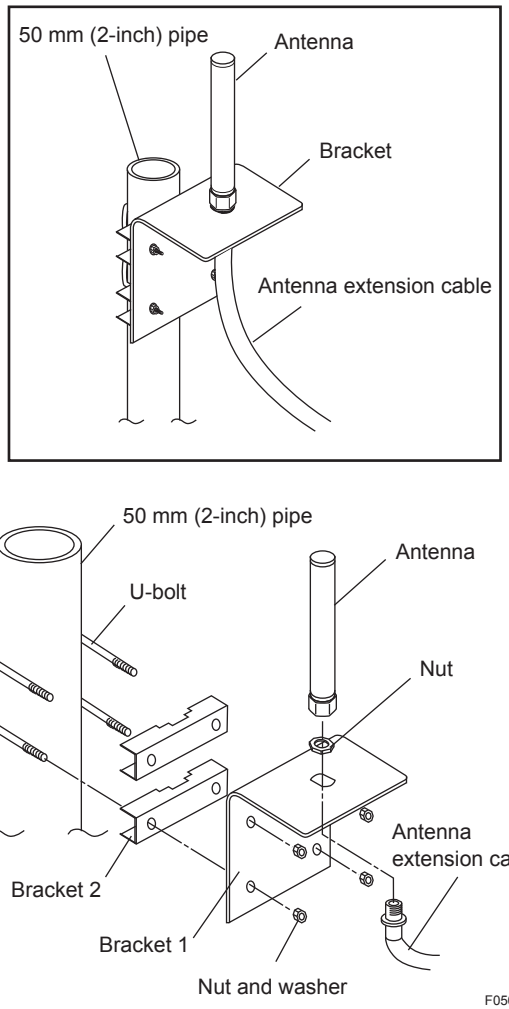


Figure 5.6 Fixing the External Antenna

■ Mounting Procedure of External Antenna

1. Fix the bracket by U-bolt and nut to 50 mm (2-inch) pipe.
2. Fix the antenna extension cable to the bracket 1 using the provided nut with a torque of 6 to 7 N·m as shown in the Figure 5.6. Use the nut which is attached to the antenna extension cable.
3. Screw the antenna into the antenna connector of the antenna extension cable on the bracket 1.
   Tighten the antenna connector with a torque of 2 to 3 N·m.
4. Protect the connection as necessary. For details of the protection, see “5.5 Mounting Antenna and Wiring.”

5.5.2.2 Wiring of Antenna Extension Cable

1. Use the provided antenna extension cable to connect the antenna connector with the external antenna. Tighten the connector of the antenna extension cable with a torque of 2 to 3 N·m. The minimum bending radius while checking the wiring position should be more than 200 mm.
2. When using two extension cables, the provided arrester should be inserted between these cables.
3. Before the wiring work, confirm the polarities (male/female) of the connectors of antenna, extension antenna cable, and arrester. Tighten the connector of the antenna extension cable with a torque of 2 to 3 N·m.
4. Protect the connectors of antenna, extension antenna cable, and arrester as necessary. See “6.1 Mounting Antenna and Wiring.”
5. Fix the extension antenna cable to the appropriate structure to protect the cable from the vibration, wind, and so on. The minimum bending radius for fixing in the state maintained for a long period should be more than 80 mm.

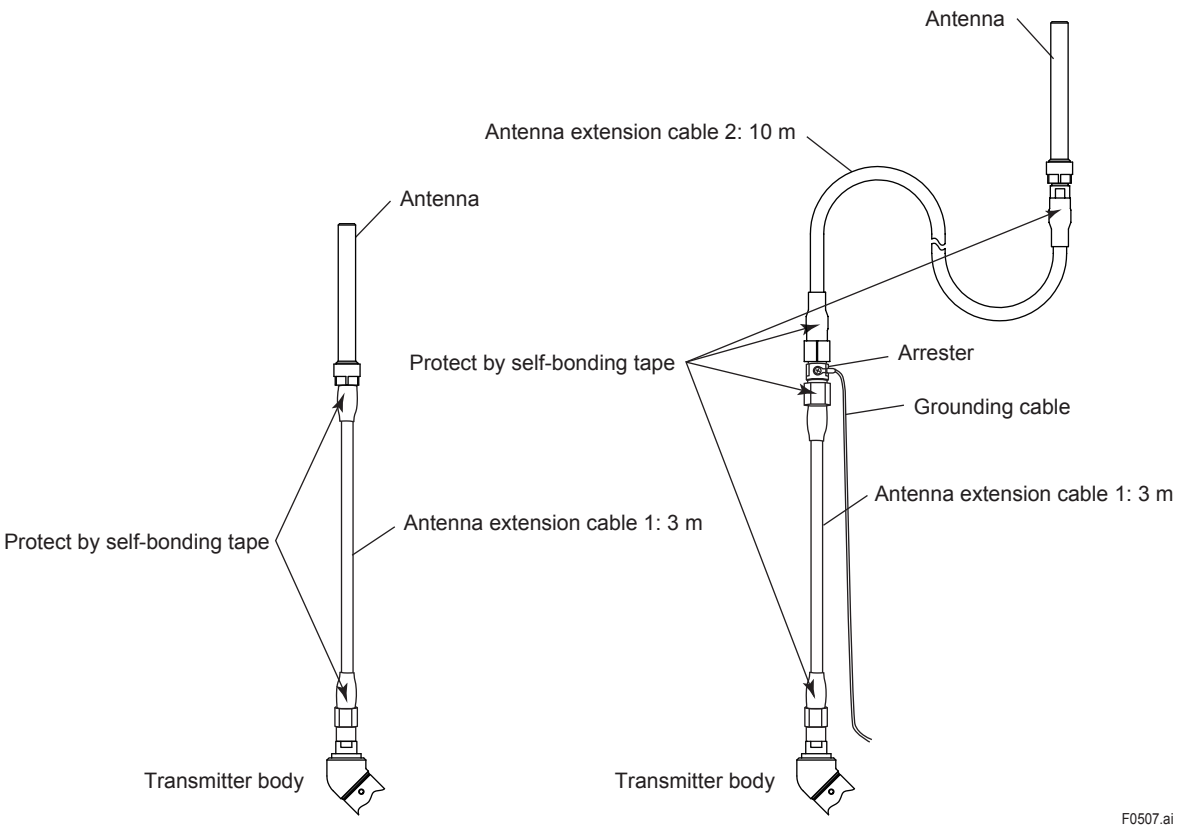


Figure 5.7 Wiring the Antenna Extension Cable

CAUTION

- Use the dedicated antenna extension cable provided by Yokogawa as accessories for the transmitters.
- The antenna extension cable and temperature sensor cable should not be bundled together.

5.5.2.3 Mounting of Arrester and Wiring

Mount an arrester between the extension cables and connect the grounding cable to the grounding terminal of the arrester as required.
Connect the grounding cable to the grounding terminal on the transmitter body. Class C grounding with the grounding resistance of 10 Ω or less is necessary. Do not share the ground with other devices.

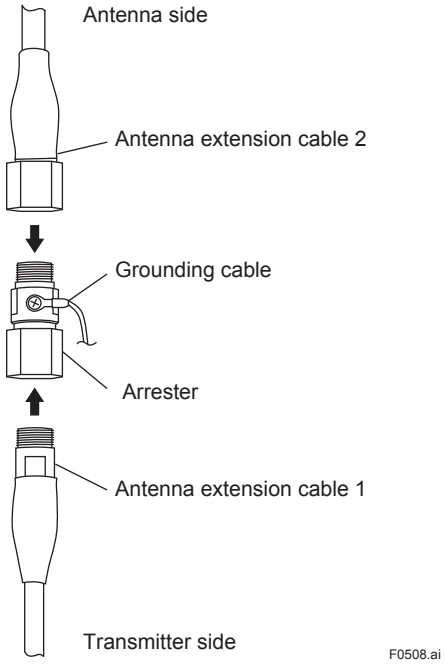


Figure 5.8 Connection of the Arrester and Antenna Extension Cable

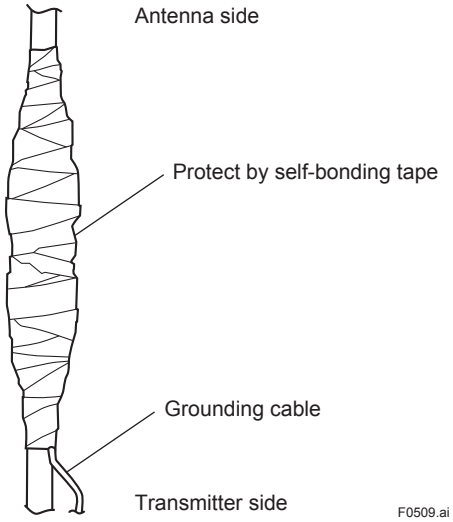


Figure 5.9 Arrester Protection by Self-bonding Tape

5.6 Grounding

When using the antenna extension cable with an arrestor, Class C grounding with the grounding resistance of 10 Ω is required. In other cases, always ground the transmitter case in accordance with national and local electrical codes. The most effective transmitter case grounding method is a direct connection to earth ground with minimal impedance.

Grounding terminals are located inside and outside of the terminal block respectively. Any of them may be used.

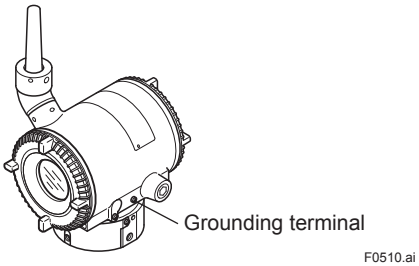


Figure 5.10 Grounding Terminal

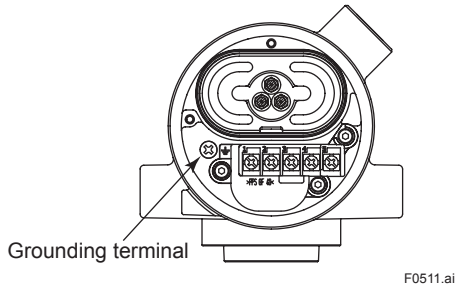


Figure 5.11 Grounding Terminal inside the Terminal Cover

CAUTION

Grounding is required for safe operation. The temperature sensor cable sheild should be connected to grounding terminal inside of the housing.

6. Operation

6.1 Preparation for Starting Operation

NOTE

It is required to set security and network information to enable the transmitter to be connected to the Field Wireless Network. For more details, refer to subsection 6.4 “Connecting to the Field Wireless Network”.

1) Checking Installation and Wiring
   Ensure that the transmitter is installed correctly and the temperature sensor is connected correctly according to the procedures described in section 4 “Installation”, and section 5 “Wiring”. When connecting the thermocouple, particular attention needs to be paid because the transmitter cannot detect a wrong polarity connection.

2) Insert batteries into the battery case, and install to the transmitter. To insert batteries into the battery case, be careful to polarity of batteries and battery case. For details of Installation of battery, refer to section 8.4.5 and 8.4.6.
   Battery case is installed in the transmitter when shipped from the factory, however, batteries are sold separately and not included.

3) Using the device configuration tool confirm that transmitter is operation properly. Check parameter values or change the setpoints as necessary.

   If the transmitter is equipped with an integral indicator, its indication can be used to confirm that the transmitter is operating properly.
   For details on how to confirm this, refer to subsection 7.4 “Self-Diagnostics.”
   ISA100 devices display self-diagnostic information in an easy-to-understand manner using four categories (Check function, Maintenance required, Failure, and Off specification) according to NAMUR NE107*

   * NAMUR NE107 “Self-Monitoring and Diagnosis of Field Devices”

■ **Confirm that transmitter is operating properly by integral indicator.**

If the transmitter is faulty, an error code is displayed.

Self-diagnostic error on the integral indicator (Faulty transmitter)

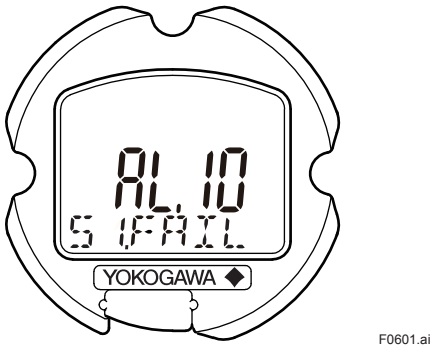


Figure 6.1 Integral Indicator with Error Code

NOTE

If any of the above errors are indicated on the display of the integral indicator or the device configuration tool, refer to subsection 8.5.3 for the corrective action.

■ **Verify and Change Transmitter Parameter Setting and Values**

The parameters related to the following items are set at factory as specified in order.

- Input sensor type
- Connection of RTD
- Measurement range (measurement lower/ upper limit, unit)

6.2 Zero-gain Adjustment

IMPORTANT

After performing zero-gain adjustment, do not power off the transmitter immediately. Turning off the power within 30 seconds resets the zero-gain adjustment value to the value before the adjustment.
Furthermore, setting the sensor type automatically resets the zero-gain adjustment value to the factory setting

When the preparation for starting operation is completed, perform a zero-gain adjustment as necessary.
This transmitter is fully calibrated at the factory and basically re-cablibration is not necessary; however, users can make the zero-gain adjustment.
The zero-gain adjustment of this transmitter can be performed by the following steps.

1) Apply the lower limit of process temperature to the sensor. Set the lower limit temperature using the device configuration tool.
2) Apply the upper limit of process temperature to the sensor. Set the upper limit temperature using the device configuration tool.

The zero-gain adjustment should be performed when the input to the temperature sensor is stabilized.
For details on the zero-gain adjustment, refer to subsection 7.3.13 Input calibration.

6.3 Starting Operation

Ensure that the installation, the wiring, the network connection, and the action of the transmitter are correct before starting operation.

IMPORTANT

Close the terminal box cover and the amplifier cover. Screw each cover in tightly until it will not turn further.

6.4 Connecting to the Field Wireless Network

■ **Preparation work prior to connecting to a field wireless network**

This transmitter does not need to be connected with a physical wire. Instead of physical wiring, it is necessary to set the field wireless devices to communicate with before installing the transmitter. This procedure is called a provisioning.
This transmitter supports provisioning via infrared communication using a provisioning device and can be securely connected to a network. If the provisioning information is not set, the transmitter cannot be connected to the field wireless network.

Provisioning:

Provisioning is work to set the security and network information to enable the transmitter to be connected to the field wireless network. This transmitter supports a provisioning method using infrared communication.

For details on provisioning using a provisioning device, connecting to a field wireless network and the setting procedure, refer to the User's Manual, FieldMate Versatile Device Management Wizard (IM 01R01A01-01E), YFGW710 Field Wireless Integrated Gateway (IM 01W01F01-01EN), and YFGW410 Field Wireless Management Station (IM 01W02D01-01EN).

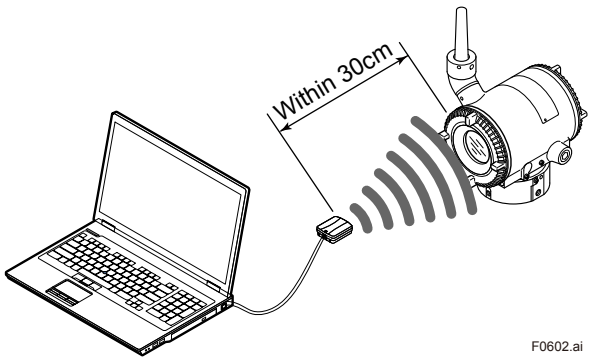


Figure 6.2 Provisioning Example

■ Provisioning work

This subsection describes provisioning work using FieldMate as the provisioning device.
Provisioning work performs provisioning for each field wireless device using FieldMate and an infrared adapter.

When using the Yokogawa recommended near infrared adapter for the provisioning device, the distance between the front glass of this instrument and the infrared surface of the near infrared adapter should be within 30 cm. For details on the Yokogawa recommended infrared adapter, refer to subsection 8.2 “Callibration Instruments Selection”.
Perform the following provisioning tasks.

- Setting provisioning information
- Creating a provisioning information file

1) Setting provisioning information
Set the device tag and Network ID using a FieldMate provisioning function. The device tag, Network ID, and join key are set in the field wireless device. It is not necessary to input a join key because FieldMate automatically generates it.

   - Setting device tag
     The device tag is used for the user to recognize the field wireless device.
   - Setting Network ID
     This is the Network ID for the field wireless network to which the field wireless device is connected. Set a value from 2 to 65535.

   The field wireless device is connected to the field wireless network corresponding to the Network ID set by provisioning work.

2) Creating a provisioning information file
The following provisioned information is stored in the provisioning information file.

   - Network ID
   - Device tag
   - EUI64
   - Join key
   - Provisioner (name of the user who performed provisioning work by FieldMate)
   - Date (Time and date when provisioning was performed by FieldMate)

   This provisioning information file is required to load from the field wireless configurator to the field wireless integrated gateway. Store the file carefully.

■ Connecting to a field wireless network

The action after installing the battery pack varies depending on the silence setting.
Mounting the battery pack automatically starts a search for the field wireless network and the transmitter goes into the join state when the field wireless gateway is found. If the field wireless gateway is not found and a specified time based on the silence mode has elapsed, a cycle of a 1-hour pause and 6-minute search is repeated until the transmitter can join the field wireless network.
For details on the silence setting, refer to subsection 7.3.15 Switching to the Silence Mode.

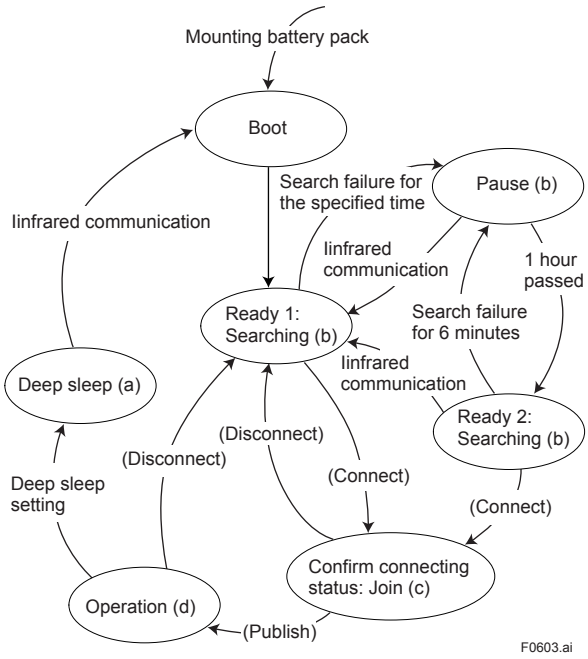
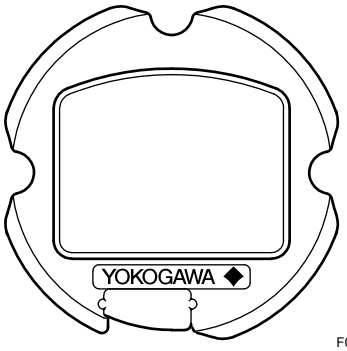


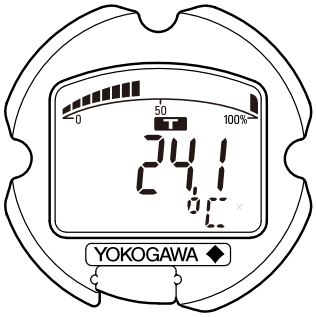
Figure 6.3 Wireless Status Transition

(a) Deep sleep



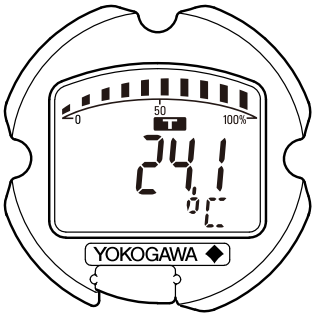
F0604.ai

(b) Ready and pause



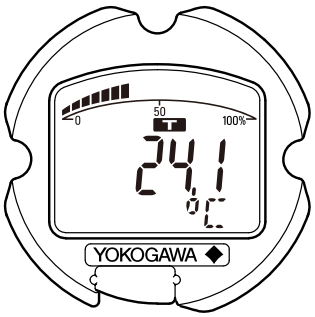
F0605.ai

(c) Confirm connecting status



F0606.ai

(d) Join



F0607.ai

NOTE

If the transmitter searches the Field wireless Network for long time ambient temperature condition, sometimes error "AL.20 LOWBAT" is displayed on the Integral Indicator. Even though using new batteries, it can occur. It occurs because of battery characteristics. After joining to the Field Wireless Network, this error will be cleared within one hour if battery has no failure.

6.5 Shutting Down the Transmitter

When shut down the transmitter, remove the battery pack or set the transmitter to deep sleep mode by the device configuration tool.

NOTE

- Refer to subsection 8.4.4 “Replacing the Battery Pack” for the battery pack removing.
- When storing the instrument with a battery pack inserted, it is recommended to put the instrument into deep sleep mode to conserve battery power. For details on how to switch to deep sleep mode, refer to subsection 7.3.14 “Switching to the Deep Sleep Mode."

7. Setting Parameters

This transmitter can remotely handle sensor type changes, range changes, Tag No. setup, monitoring of self-diagnostic results, according to communication with the field wireless configuration tool or the device configuration tool.

7.1 Environment for parameter setting

After installing the battery pack, perform provisioning and have the instrument join the field wireless network.

This transmitter supports the OOB (out-of-band) method using infrared communication. For details on how to provisioning, refer to section 6.4 “Connection to Field Wireless network”

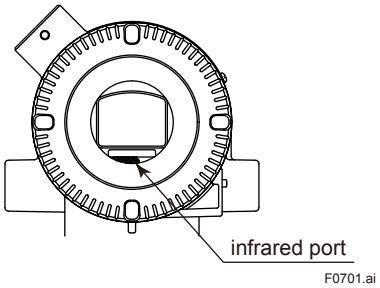


Figure 7.1 Connecting the configuration Tool

7.2 Preparing Software

7.2.1 Softwares for the Field Wireless Configuration Tool and the Device Configuration Tool

Before using the device configuration tool, confirm that CF/DD and DeviceDTM for your transmitter (wireless YTA) are installed in the device configuration tool.

CF/DD and DeviceDTM are provided by DVD-ROM attached to YFGW710 Field Wireless Integrated Gateway.

Refer to YFGW710 Field Wireless Integrated Gateway (IM 01W01F01-01EN) for details.

CF (Capabilities File) / DD (Device Description)

A CF file contains information, such as the vendor of the field device, its model and revision, available types of process data (flow rate, temperature, pressure, etc.), and number of data items. A DD file contains the information on parameters, such as data structures and attributes.

DeviceDTM

DeviceDTM, (Device Type Manager) is driver software for field devices provided based on the FDT (Field Device Tool) technology.

The field wireless configuration tool or the device configuration tool allows confirming the device information.

Refer to Subsection 8.2 “Calibration Instruments Selection” for the field wireless configuration tool or the device configuration tool of our recommendation.

7.2.2 Software Download

Software download function permits to update wireless field device software via ISA100.11a wireless communication. For details, refer to YFGW710 Field Wireless Integrated Gateway (IM 01W01F01-01EN).

7.3 Setting Parameters

7.3.1 Parameter Usage and Selection

Before setting a parameter, please see the following table for a summary of how and when each parameter is used. The integral antenna type is applicable only for a single sensor input which is assigned to AI1. The detachable antenna type is applicable for dual sensor input assigned to AI1/AI2 accordingly.

IMPORTANT

After setting and sending data with the field wireless configuration tool or the device configuration tool, wait 30 seconds before turning off the transmitter. If it is turned off too soon, the settings will not be stored in the transmitter.

Table 7.1 Parameter Usage and Selection

Item	Description
Tag No	Sets the tag No. for Device Tag (software tag). The tag No. can be set Sixteen characters (alphanumeric characters, including - and •).
Output mode	Allows outputting process value and self-diagnostic information via field wireless network. Either or all of temperature / voltage / resistance (AI1/AI2: Process Value), and self-diagnostic information (UAPMO: Diagnostic Status) can be set output data.
Range	Range corresponding for 0% to 100% signal is set with actual input applied.
Integral indicator display setting	Sets the process value, bar graph to display on the LCD.
Display temperature unit setting	Sets the temperature unit to display.
Burnout setting	Sets the output status when the input sensor has burned out.
Zero-gain adjustment setting	Sets the input adjustment function using two adjustment points..
Reset adjustment value	Reset the trim adjustment to the factory setting. The zero-gain adjustment set by user can be returned to the factory setting.
Software write protect	Prohibit writing the setting data.
Adjustment information and memo field	Memo field available to write the check date, checker and others (as an adjustment information), or anything.
Operational mode	Set the operational mode of the sensor and integral indicator, etc.

NOTE

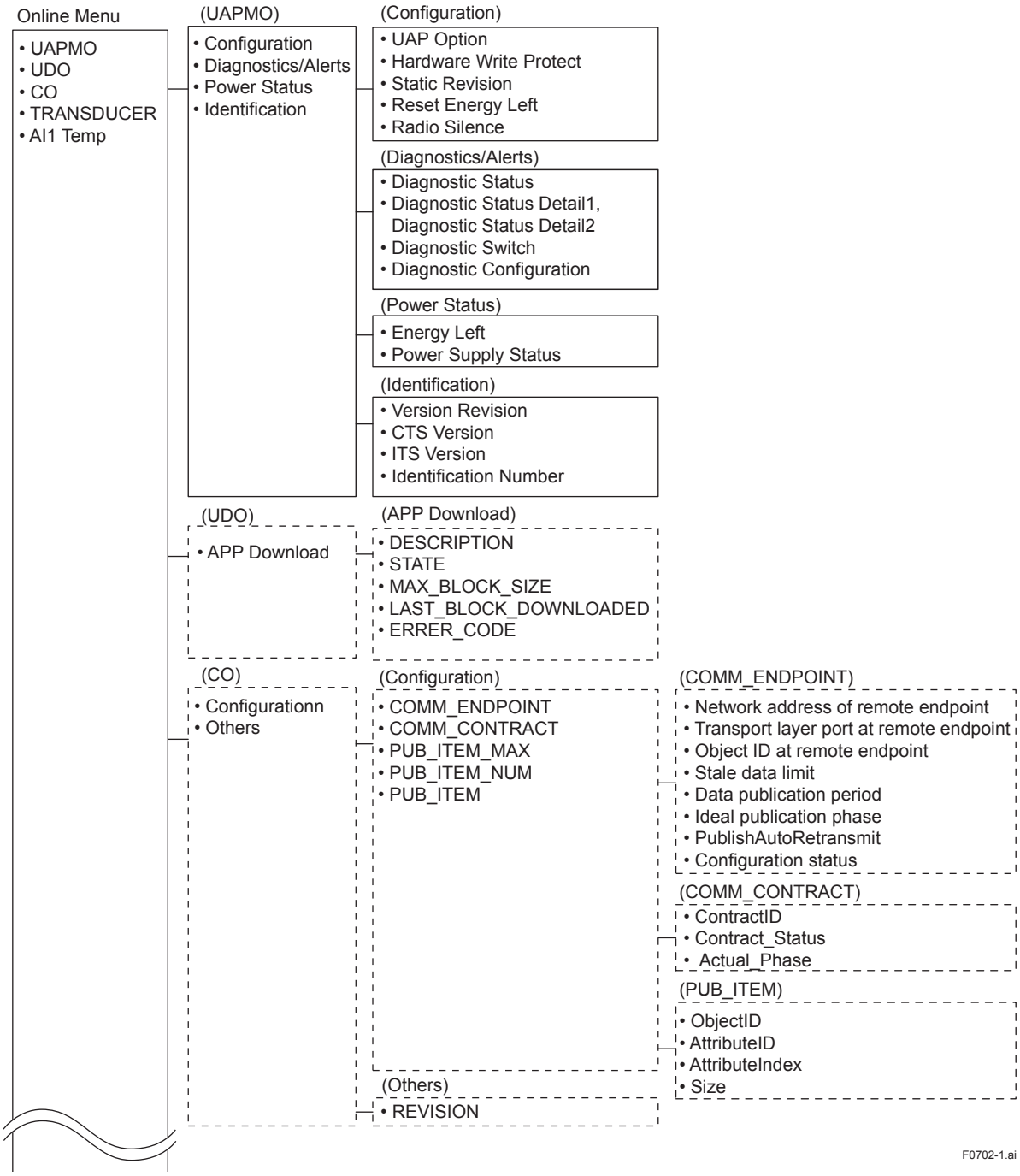
Some of the parameter settings are in the dialogue form called method, the on-line instructions you can configure the parameters easily.

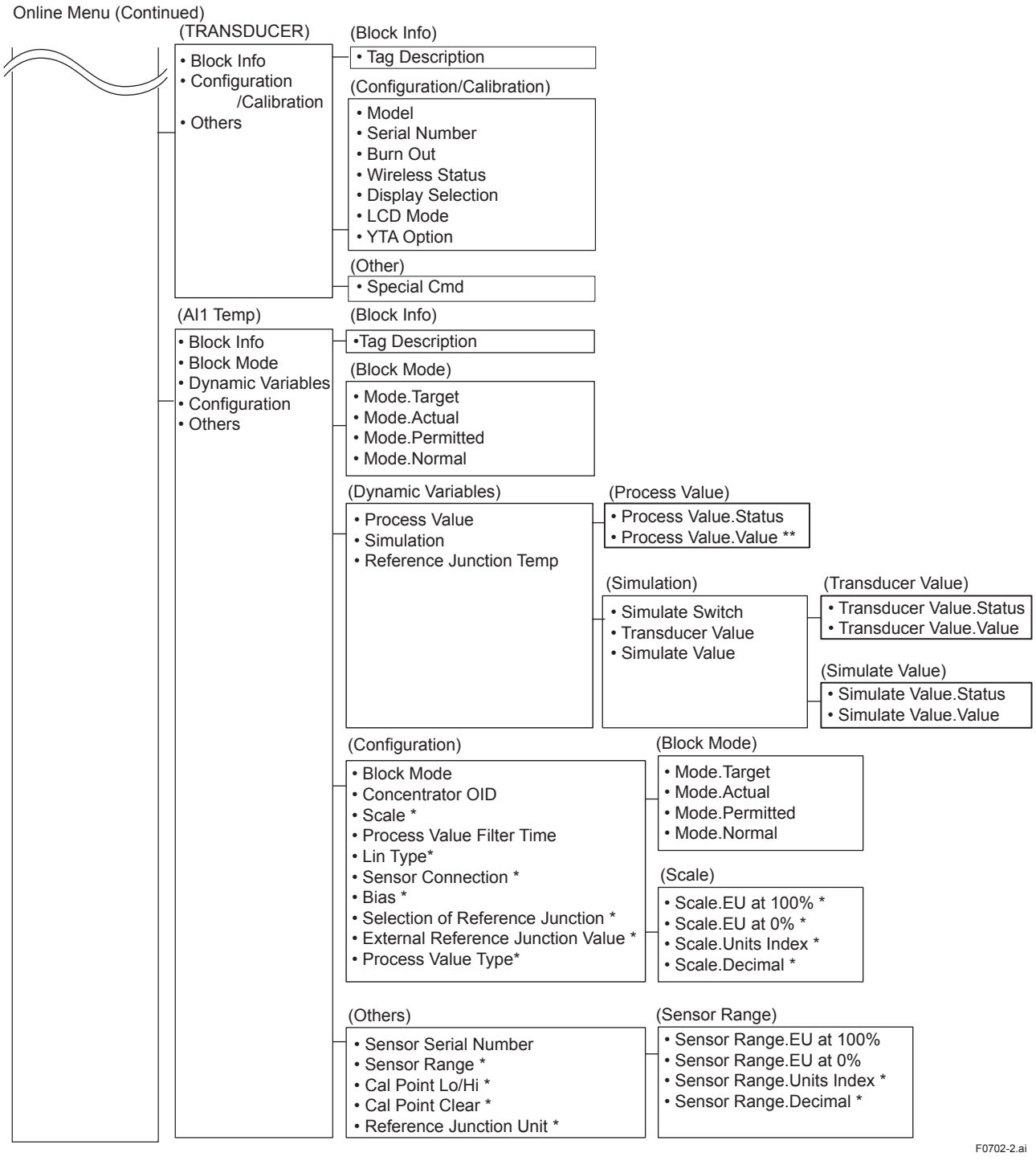
7.3.2 Function Block and Menu Tree

(1) Function Block

The function of this transmitter is shown below. A specific function might not be able to be used according to the field wireless configuration tool used. When the field wireless configuration tool of our recommendation is used, the software attached to the Field Wireless Integrated Gateway is necessary for setting the dotted line part.
Refer to Subsection 8.2 “Calibration Instruments Selection” for the field wireless configuration tool of our recommendation.

(a) Integral antenna type: single sensor input (Amplifier housing code 7)

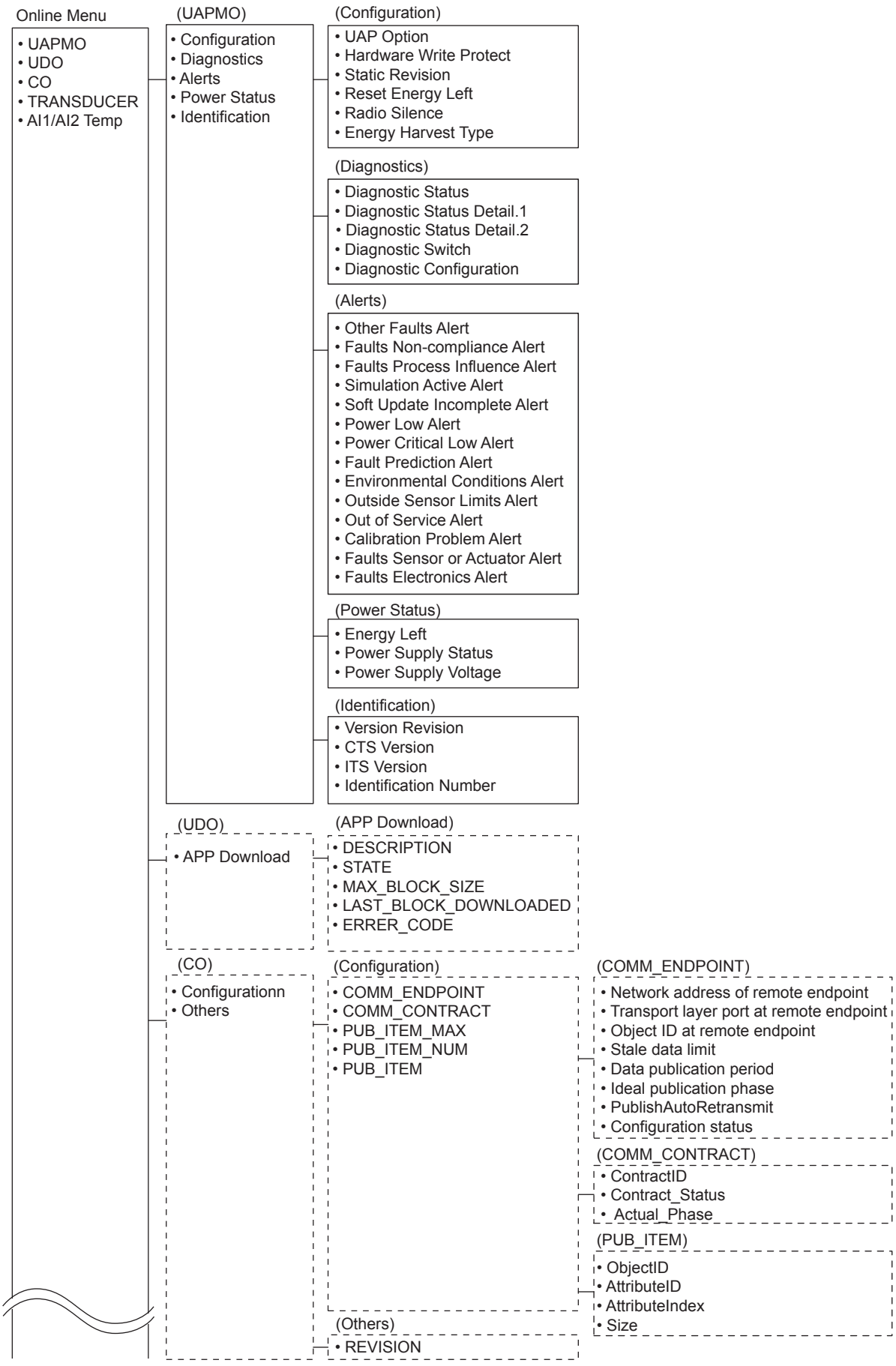




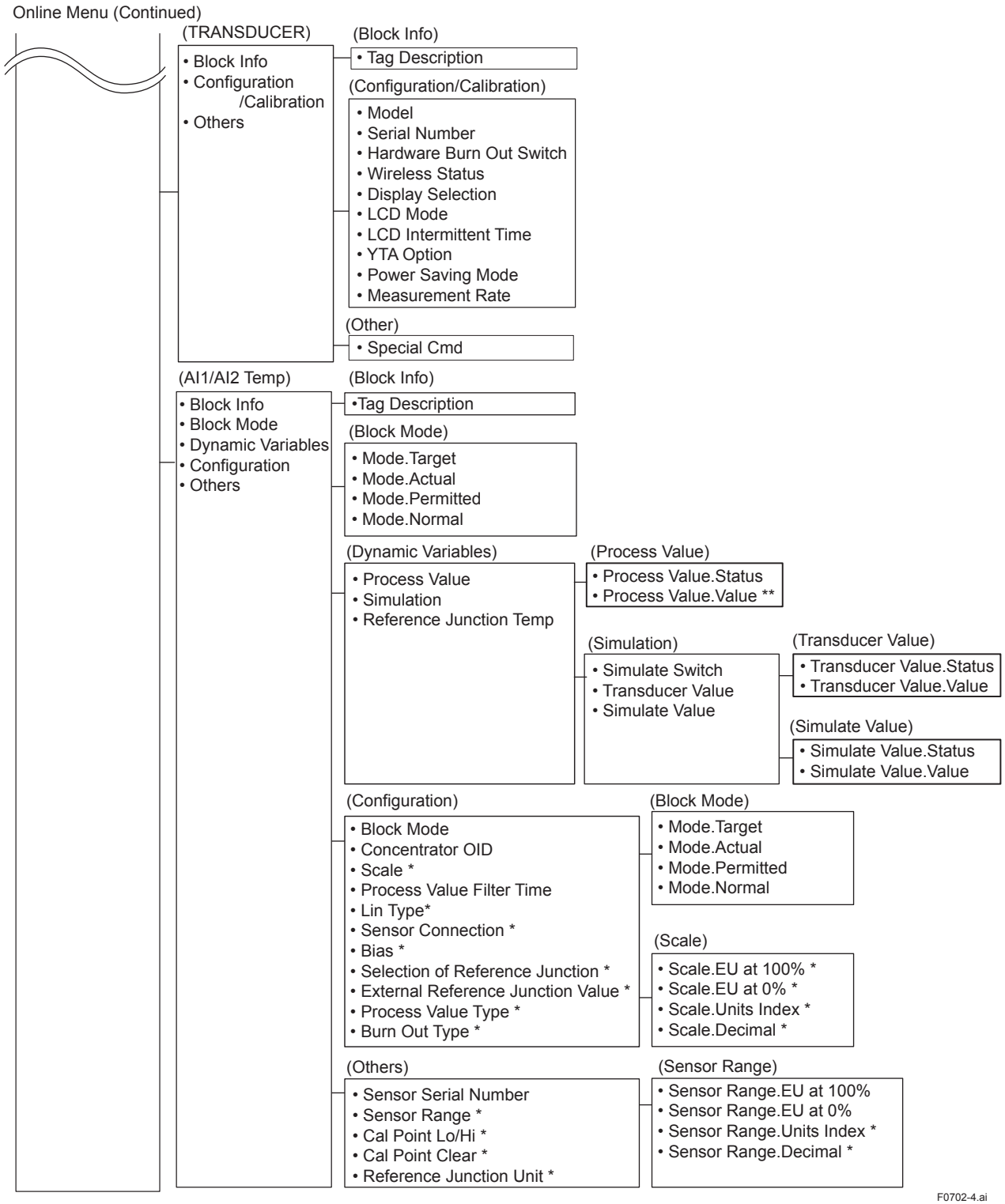
F0702-2.ai

*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).
**: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to Manual.

(b) Detachable antenna type: dual sensor input (Amplifier housing code 8 and 9)



F0702-3.ai

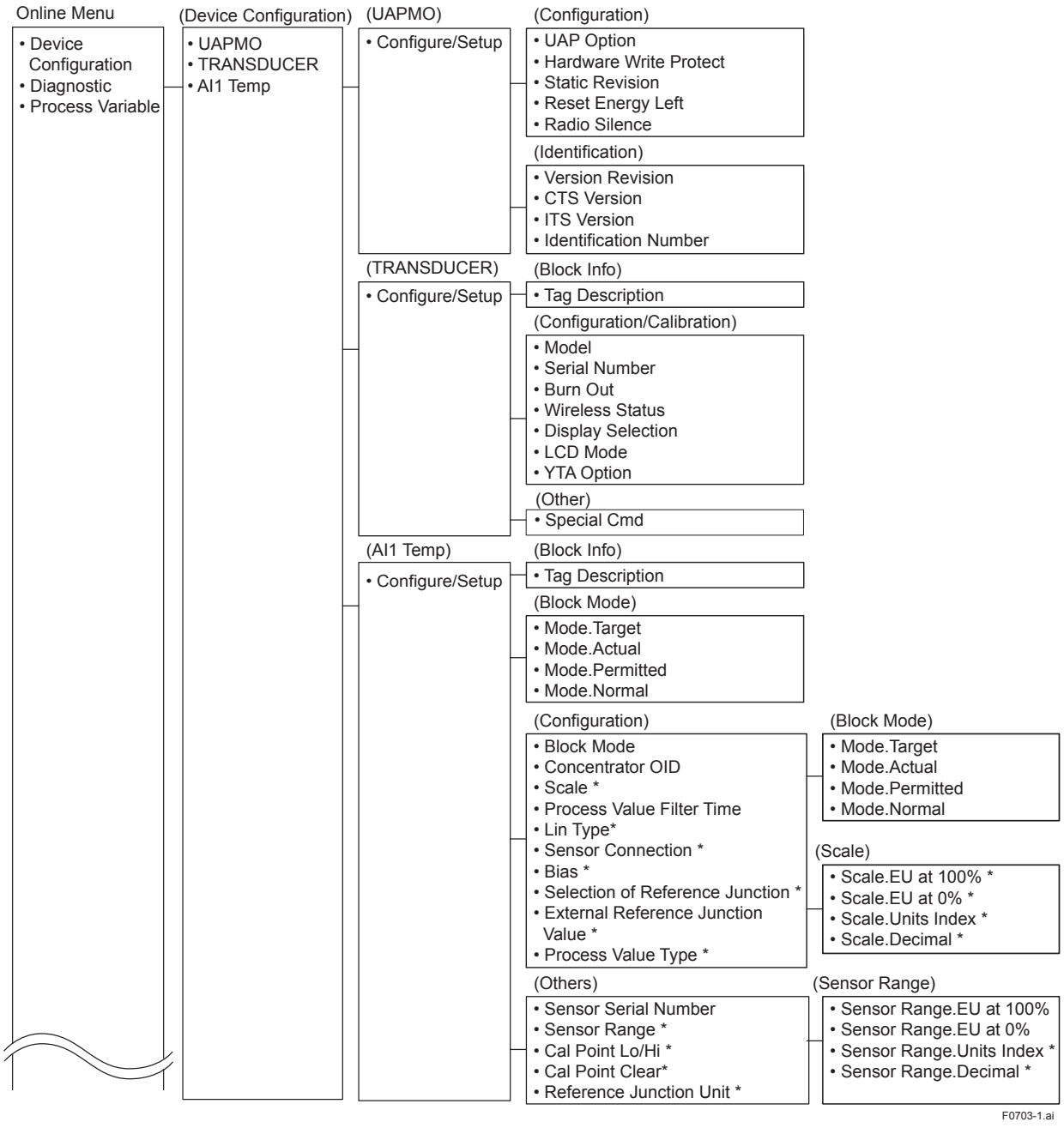


*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).
**: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to Manual.

(2) Menu Tree

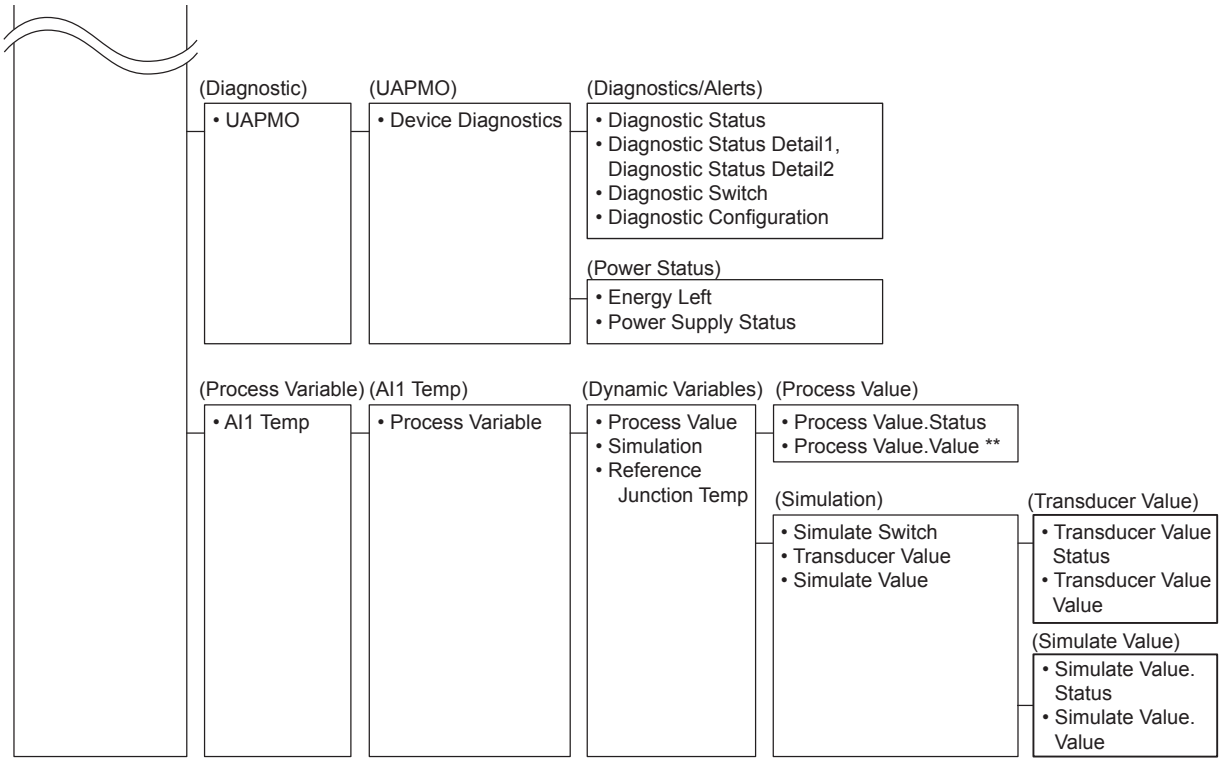
The menu tree of the device configuration tool of our recommendation is shown below. Refer to Subsection 8.2 “Calibration Instruments Selection” for the device configuration tool of our recommendation.

(a) Integral antenna type: single sensor input (Amplifier housing code 7)



*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).

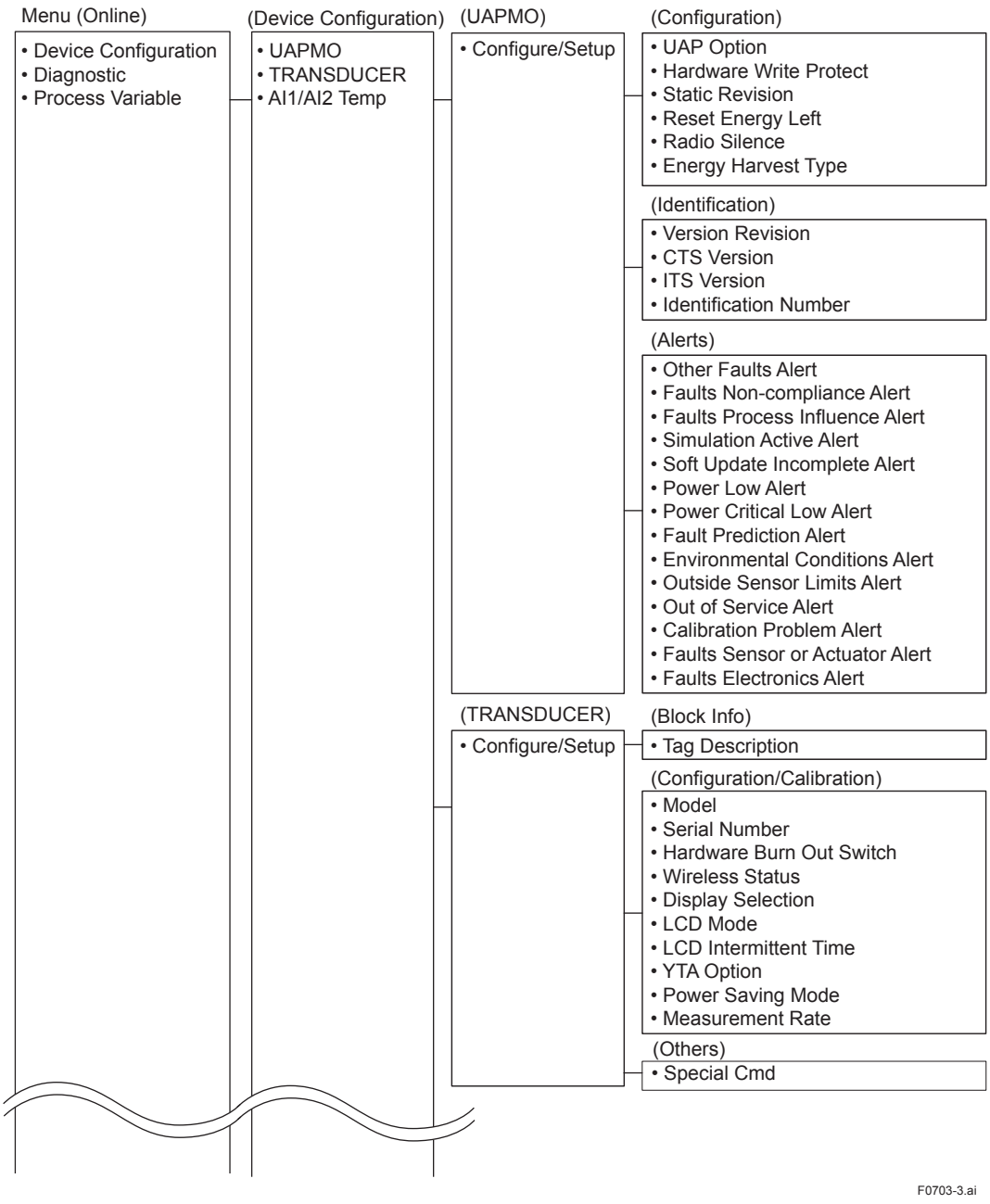
Online Menu (Continued)



F0703-2.ai

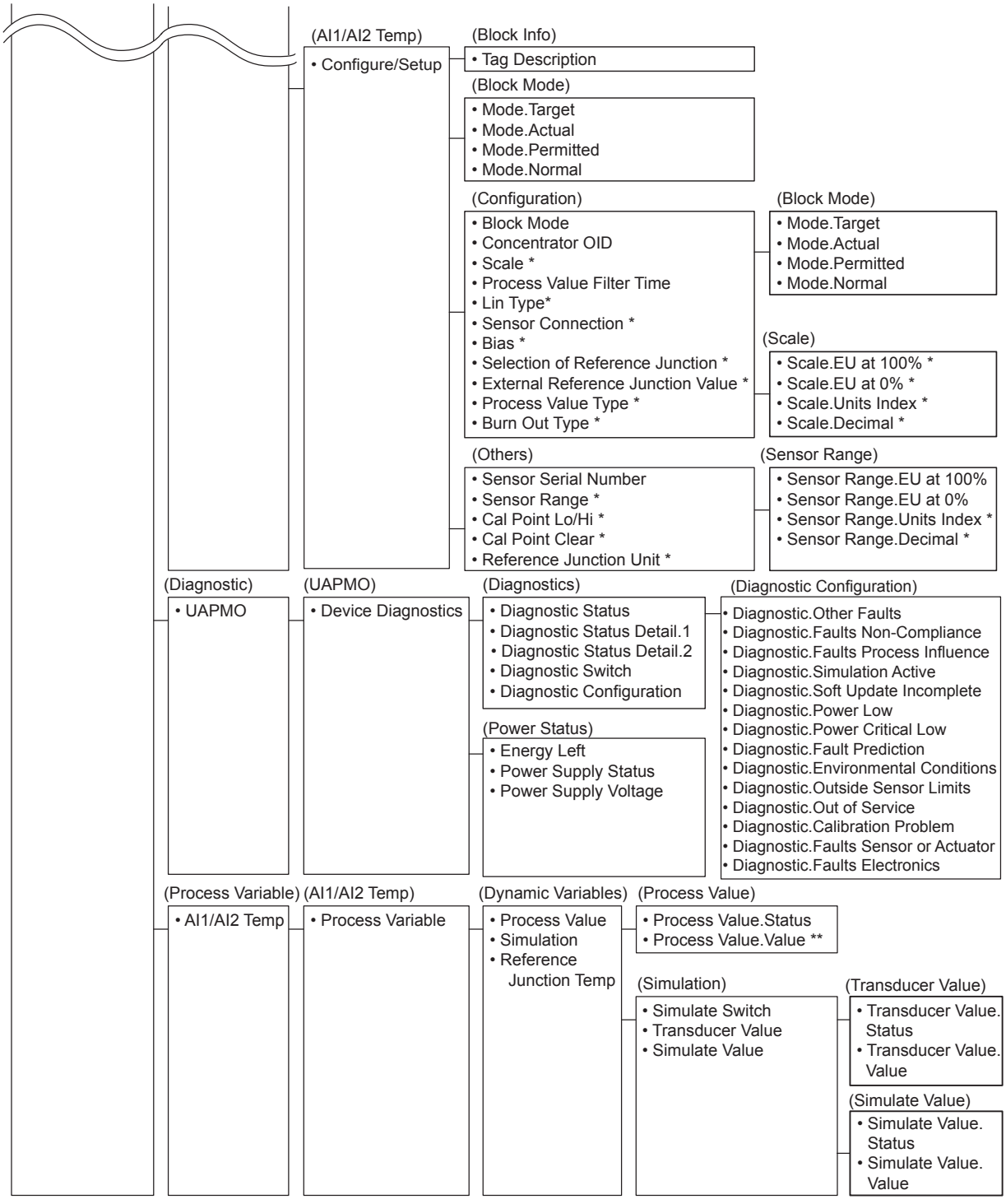
**: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to Manual.

(b) Detachable antenna type: dual sensor input (Amplifier housing code 8 and 9)



F0703-3.ai

Online Menu (Continued)



F0703-4.ai

*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).
**: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to Manual.

7.3.3 Parameters for Wireless Communication

(1) Network Information

Concentrator object block: Configuration.

The network-related information can be checked.

(2) Update Time

CO block: Data publication period

Sets the update time value to 1 to 3,600 seconds. When using two temperature sensors for dual input type, the minimum update time is 2 seconds. The setting affects the battery life.

When update time is set 0 seconds, the transmitter is stopped to update process variables by way of the field wireless network. And the transmitter continues to measure process variables with special interval time internally.

(3) Remaining battery life

UAPMO block: Energy Left

The number of days of battery life remaining is indicated assuming ambient temperature condition as 23 degrees Celsius. It takes several days for the indicated value to be stabiilzed after the power on and initialization of the remaining battery life.

UAPMO block : Reset Energy Left

When changing batteries, the remaining battery life is initialized by Reset Energy Left parameter.

(4) LCD display

The following steps describe how to set LCD display.

- **Integral antenna type (Amplifier housing code: 7)**

1. On/Off of display
   When “LCD Intermittent” in LCD Mode is parameter is selected, the LCD first displays a set of screens to be shown and then turns off for a minute, and the display keeps the cycle repeatedly. Not selecting this parameter turns the LCD off.
2. On/Off of continuous display mode
   When “LCD Continue” in LCD Mode is selected, the LCD displays for 5 minutes continuously then transits to the setting in the LCD Intermittent.
   When measurement mode is set as continuous mode, the LCD displays continuously regardless of display mode.
   When the update time is set to 1 second, the LCD display stays on regardless of the status in LCD Mode.
3. On/Off of bar graph
   Select “LCD Bargraph ON” in LCD Mode when the bar graph is required.

- **Detachable antenna type (Amplifier housing code: 8 or 9)**

1. On/Off of display
   When “Enable” in LCD Mode is selected, the LCD displays a set of screens to be shown and turns off for the specified time based on LCD Intermittent Time, and the display keeps the cycle repeatedly. Not selecting this parameter turns the LCD off.
2. On/Off of continuous display mode
   When “Enable” is set to LCD Mode and zero is set to LCD Intermittent Time, the LCD displays continuously.
3. On/Off of bar graph
   Select “LCD Bargraph ON” in LCD Mode when the bar graph is required.

When the wireless connection process is in the status of “ready,” “pause,” or “join,” the LCD display stays on regardless of the status in LCD Mode.

NOTE

When the device detects AL02, AL03, AL10, AL11 and AL12 the LCD display stays on regardless of the status in LCD mode. See Table 8.4 Error Message Summary for details.

7.3.4 Tag and Device Information

If these are specified when ordering, the designated Tag No. and device information are set and shipped.

Tag No. and device information can be checked as follows.

■ Procedure to call up the tag No. and device information

- Device Tag (Software Tag)
  This is specified when writing characters (up to 16 characters) that differ from those specified in Tag No. to the amplifier tag. For details on how to confirm this, refer to subsection 6.4. ”Connecting to the Field Wireless Network”.
- Tag Description
  This is a universal parameter to store the comment that describes the content of the tag located in the TRANSDUCER and AI blocks.

■ Limitation of Device Information
When changing the device information, input the information based on the following limitation on the number of characters.

- Message function (up to 32 characters)
  TRANSDUCER block : Tag Description
  AI1/AI2 block : Tag Description

7.3.5 Setup the Integral Indicator

As for the integral indicator display, either the temperature, voltage, resistance or the % value of the temperature, voltage, resistance can be selected and displayed. The display is in the output format of the process value.

Specify AI block to display on the LCD.

■ LCD display parameter (Display Selection)

Select AI block to display on the LCD from AI1 or AI2.

■ Call up the display parameter (Process Value Type)

AI1 block: Configuration: Process Value Type

Either actual target value (Direct) or % (Indirect) can be selected.

7.3.6 Power Saving Mode Setting

This function is applicable for dual input type with a detachable antenna, Amplifier housing code 8 and 9. Enabling the power saving mode on prolongs the battery life of the transmitter, in which the transmitter's measurement and calcutattion are suitable for general use with a gradual change in the process and ambient temperature. On the other hand, when the power saving mode is set to off, the transmitter is capable of a steep change in the process and ambient temperature wtih its high responsiveness trading off of the battery life.

■ Procedure to call up the power saving mode

TRANSDUCER block : Power Saving Mode
Off: Disable
On: Enable

7.3.7 Unit

The unit for the process value is set at the factory. The specified unit of the input sensors set (°C if not specified).

When the unit of the temperature, voltage, and resistance is displayed, set the Process Value Type parameter to actual target value (Direct).

And sensor type set by the sensor type setting parameter (Lin Type) must be corresponded with the unit displayed.

When using the resistance temperature sensor or the thermocouple sensor, unit displayed set °C or others, using voltage, set mV, and using resistance, set ohm.

The unit can be set by following the procedure below.

■ Procedure to call up the unit parameter (Units Index)

AI1/AI2 block: Scale : Units Index

To change the unit, select the desired unit from the displayed unit list.

7.3.8 Measurement Range

The unit parameter is set at the factory before shipment if specified at the time of order. To change the measurement range, follow the procedure below.

■ Procedure to call up the lower limit setting parameter (EU at 0%)

AI1/AI2 block : Scale : EU at 0%

■ Procedure to call up the upper limit setting parameter (EU at 100%)

AI1/AI2 block: Scale : EU at 100%

Set the lower limit setting parameter (EU at 0%) and upper limit setting parameter (EU at 100%) to the unit specified in the unit parameter (Units Index).

7.3.9 Input Sensor

When changing the sensor type, it is necessary to change the parameters related to the sensor type. The setting items are the sensor type and the number of cables. The input terminal of YTA supports the following sensor types.

Thermocouple: TYPE B, E, J, K, N, R, S, T (IEC 584)
Resistance thermometer (RTD): Pt100, Pt200, Pt500 (IEC 751)
Resistance: 0 to 2000 ohm
DC voltage mV:
−10 to 100 mV (Single sensor input type)
−10 to 220 mV (Dual sensor input type)

Check the connections between the input terminals and temperature sensors and set the correct sensor type and the number of wire connections for the parameters. (Refer to Figure 7.2)

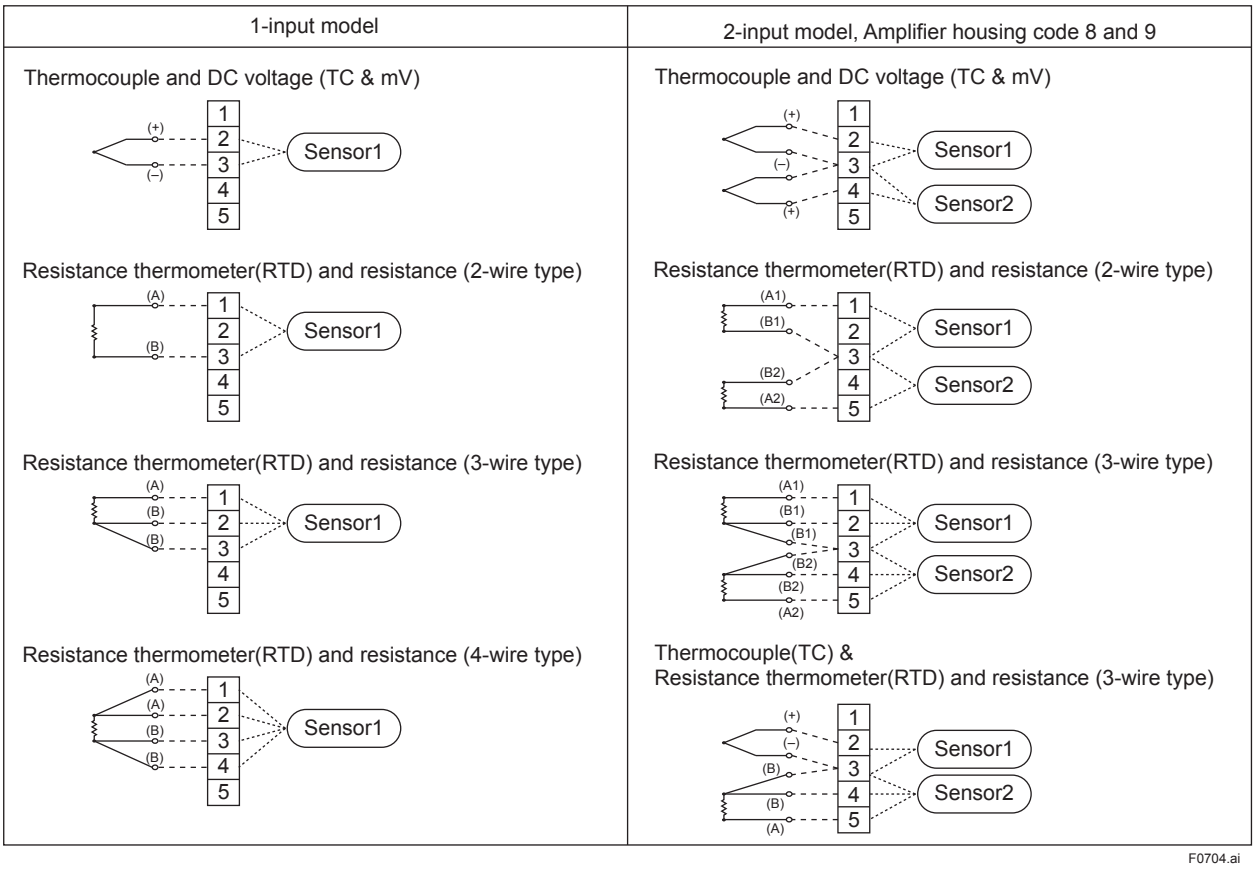

1-input model
2-input model, Amplifier housing code 8 and 9
Thermocouple and DC voltage (TC & mV)
Resistance thermometer(RTD) and resistance (2-wire type)
Resistance thermometer(RTD) and resistance (3-wire type)
Resistance thermometer(RTD) and resistance (4-wire type)
Thermocouple(TC) &
Resistance thermometer(RTD) and resistance (3-wire type)
Sensor1
Sensor2
F0704.ai

Figure 7.2 YTA510 Wire Connection Diagram

1) Setting the Sensor Type

- Procedure to call up the sensor type setting parameter (Lin Type)

  AI1/AI2 block: Lin Type

  Set the sensor type.

- Procedure to call up the sensor type information parameter (Sensor Range)

  AI1/AI2 block: Sensor Range : EU at 0%
  AI1/AI2 block: Sensor Range : EU at 100%

  Displays the lower and upper limit values that can be measured by the sensor type set in the sensor type setting parameter (Lin Type) as the lower limit information parameter (EU at 0%) and the upper limit information parameter (EU at 100%).

2) Setting the Temperature Sensor Connection

This is set when using the resistance temperature sensor.

- Procedure to call up the connection setting parameter (Sensor Connection)

  AI1 block: Sensor Connection

  Select and set any of the 2-, 3-, or 4-wire methods corresponding to the resistance temperature sensor.

  AI2 block: Sensor Connection

  Select and set either 2- or 3-wire methods corresponding to the resistance temperature sensor.

NOTE

In 4-wire connection for the dual sensor input type, first set "Not Used" to AI2: Lin Type, then set the AI1: Lin Type/Sensor Connection.

3) Setting the Cold Junction Compensation (CJC) of the Thermocouple Sensor

This is set when using the thermocouple sensor.

- Procedure to call up CJC function parameter(Selection of Reference Junction)

  AI1/AI2 block: Selection of Reference Junction

  Select the CJC function.
  To calibrate voltage for the thermocouple input, set the cold junction temperature to No Reference (0).

- Procedure to call up external temperature Compensation parameter(External Reference Junction Value)

  AI1/AI2 block: External Reference Junction Value

  In the CJC function parameter (Selection of Reference Junction), the cold junction temperature value of the thermocouple is selected the external (2), set the external compensation temperature.

The CJC is also called reference junction compensation.

IMPORTANT

Setting the sensor type automatically resets the zero-gain adjustment value to the factory setting.

7.3.10 Assignment to AI Object

Output of the process value via field wireless network is set by AI1/AI2 block.
Either actual target value or % value of the temperature, the voltage, and resistance is set as the output of process value from the AI1/AI2 block.

7.3.11 Burnout Setting

This function is applicable for dual input type with a detachable antenna, Amplifier housing code 8 and 9. Specify the direction of PV value at the burnout.

- AI1/AI2 block: Burn Out Type

  Enable Hard Switch: the direction specified by hardware switch
  Up: Higher side
  Down: Lower side
  Selecting Up and Down disables the setting of hardware switch

7.3.12 Write Protect

Hardware write protection and software write protection functions are available for this transmitter.

1) Procedure to call up the protection setting parameter (UAP Option)

The following settings can be configured in the UAP Option parameter.

- Setting to enable or disable software write protection.

- Setting to enable or disable the hardware write protection switch.
- Setting to enable or disable changing the setting to the Diagnostic Switch and Diagnostic Configuration parameters.

2) Procedure to call up the protection setting display parameter (Hardware Write Protect)

UAPMO block : Hardware Write Protect

The Hardware Write Protect parameter enables the switch status of hardware write protection to be displayed.

For the relationship between hardware write protection and software write protection, refer to section 9. "Parameter Summary".

7.3.13 Input Calibration

The input calibration function is used to adjust to the transmitters internal interpretation of the input signal. Perform the calibration procedure for Sensor1 and Sensor2 separately.
Two points, namely, the lower adjustment point called Zero point and the upper adjustment point called Gain, are adjusted, respectively. There are two adjustment methods. One method uses a reference signal generator (e.g. a voltage generator or variable resistor) and the other uses the signal from a temperature sensor immersed in the solution with a known temperature.
Input adjustment is performed by inputting (writing) the signals (voltage, and resistance values) currently being input as the parameters. This instrument automatically corrects the error between the written data and the internally calculated value.
Follow the procedure below for Sensor1 (AI1) for example.

1) Setting the Input Adjustment Value

a) Setting the AI1 block write mode

- AI1 block : Mode : Target

  Set the Target parameter to O/S.

b) Setting the update period

- CO block: Data publication period

  Set the data publication period parameter to 1 second. The computation period in the transmitter will also be synchronized to the update period and set to 1 second.

c) Setting the sensor type

- AI1 block: Lin Type

  Set the sensor type used in the Lin Type parameter.

d) Setting the cold conjunction compensation

- AI1 block: Selection of Reference Junction

  Set the Selection of Reference Junction parameter to No Reference (0) in order to remove the effect of the cold junction compensation when using the thermocouple for the sensor type.

e) Perform Zero Point Adjustment using a reference input generator. The input value is adjusted near the zero point within the measurement range used.

f) Set the Zero Point Adjustment value when the input is stabilized.

- AI1 block: Cal Point Lo
  Set the Cal Point Lo parameter to the voltage value (unit: mV) when the temperature sensor is the thermocouple, and set the resistance value (unit: Ω) when the temperature sensor is the resistance temperature sensor.

g) Perform gain-point adjustment using a reference input generator. The input value is adjusted near the gain point within the measurement range used.

h) Set the gain-point adjustment value when the input is stabilized.

- AI1 block: Cal Point Hi

  Set the Cal Point Hi parameter to the voltage value (unit: mV) when the temperature sensor is the thermocouple, and set the resistance value (unit: Ω) when the temperature sensor is the resistance temperature sensor.

i) Setting the AI1 block write mode

- AI1 block : Mode : Target

  Set the Target parameter to Auto and ensure that the setting error of the adjustment value has not occurred.

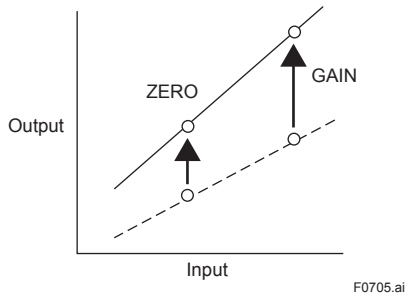


Figure 7.3 Trim function images

IMPORTANT

Setting the sensor type automatically resets the zero-gain adjustment value to the factory setting.

2) Clearing the Adjustment Value

The adjustment value set with input adjustment can be cleared and reset to the factory setting.

- Procedure to call up the adjustment value reset parameter (Cal Point Clear)

  AI1/AI2 block: Cal Point Clear

  Set the Cal Point Clear parameter to Clear.

7.3.14 Switching to the Deep Sleep Mode

When the instrument will not be used for a long time, switch the instrument to the deep sleep mode to conserve battery power. To switch to deep sleep mode, follow the procedure below.

- Procedure to call up the switch-to-deep-sleep parameter (Special Cmd)

  TRANSDUCER block : Special Cmd

  Set deep sleep mode (Standby) to the Special Cmd parameter for the TRANSDUCER block. To start from deep sleep mode, either remove and insert the battery pack, or use the configuration tool.

CAUTION

After setting the deep sleep mode by infrared device configuration tool, keep the infrared port of device away from any other infrared signals.

NOTE

- This procedure to switch to deep sleep mode can only be use for wireless communication.
- Transmitter becomes the stop state after setting deep sleep mode and cannot reply any request from Communication Tool.
- For this reason, there is the case that an error is display on Communication Tool.
- To wake up from deep sleep mode, please pull battery pack and wait more than 30 seconds before attaching battery pack.

7.3.15 Switching to the Silence Mode

This is a function to pause the instrument when it cannot join the field wireless network after a specified time has elapsed. This function is effective in conserving battery power when, for example, the installation of the field wireless integrated gateway is delayed compared to that of field wireless devices. The default value is 28800 seconds (about 8 hours). Thereafter, a cycle of a one-hour pause and six-minute search is repeated until the instrument can join the field wireless network.

- Procedure to call up the switch-to-silence parameter (Radio Silence)

  UAPMO block : Radio Silence

  Set 0 to 2^{31} seconds for the Radio Silence parameter of the UAPMO block. If 0 is set, the Radio Silence parameter is invalid. To start from the silence mode, either remove and insert the battery pack, or use the configuration tool.

7.4 Self-Diagnostics

7.4.1 Identify Problems by Using the Communicator

The configuration tool allows checking the self-diagnosis results and setting errors of this instrument.
First, check Diagnostic Status of the self-diagnostic result.

■ Procedure to call up the self-diagnostic parameter

UAPMO block: Diagnostic Status

Any of the four categories (Check function, Maintenance required, Failure, and Off specification) according to NAMUR NE107* is supplied to Diagnostic Status of each diagnostic result.

Table 7.2 Diagnostic Status

Bits	Contents	Example NAMUR NE107 Categorization(*)
Bit31(MSB)	F: Failure status	---
Bit30	C: Function check status	---
Bit29	O: Out of specification status	---
Bit28	M: Maintenance required status	---
Bit27	Faults in electronics	F
Bit26	Faults in sensor or actuator element	F
Bit25	Installation, calibration problem	C
Bit24	Out of service	C
Bit23	Outside sensor limits	O
Bit22	Environmental conditions out of device specification	O
Bit21	Fault prediction: Maintenance required	M
Bit20	Power is critical low: maintenance need short-term	M
Bit19	Power is low: maintenance need mid-term	M
Bit18	Software update incomplete	C
Bit17	Simulation is active	C
Bit16**	Faults due to process influence	F
Bit15**	Faults due to non-compliance with specified operating conditions	F
Bit14**	Other faults	F
Bit13-Bit08	reserved by WCI	---
Bit07-Bit01	vendor specific area	---
Bit00	Detail information available	
	1: available	---
	0: no available"	

*: NAMUR NE107 "Self-Monitoring and Diagnosis of Field Devices"
**: Applicable for dual input type with detachable antenna, Amplifier housing code 8 and 9.

Checking the Diagnostic Status category allows taking the proper action. The Diagnostic Status contents are common for all ISA devices, and the setting for the Diagnostic Status category can be changed. For further details, refer to Diagnostic Status Detail.
In Diagnostic Status Contents that can be diagnosed by the YTA, the alert category set in Out of Service can be changed to Check function. To do so, follow one of the two procedures below.

a) UAPMO block: UAP Option select “enable”.
b) UAPMO block: Diagnostic Configuration change Out of Service from “Failure” to Check function.
c) UAPMO block: UAP Option select “disable“.

The contents of diagnostic status are defined either valid or invalid at Diagnostic Switch parameter. Follow the example below to change “Out of Service” to invalid.

a) UAPMO block: UAP Option select “enable“.
b) UAPMO block: Diagnostic Switch turn “Off“ for Out of Service.
c) UAPMO block: UAP Option select “disable“.

Note: Be careful when changing the alert category and turning detection on and off as described above. Be sure to set UAP Option to disable again to prevent setting errors.
* NAMUR NE107 “Self-Monitoring and Diagnosis of Field Devices”
In Diagnostic Configuration setting, select one from the followings; F: Failure status, C: Function check status, O: Out of specification status, or M: Maintenance required status.

7.4.2 Alert Report

YTA generates alert information related to Diagnostic Status and automatically sends to a field wireless gateway. To use this function, the following alert setting is necessary. When “Out of Service” for Diagnostic Status alert is required, choose “FALSE” for [Out of Service.Alert Disable] in the UAPMO block. Refer to the field wireless gateway User’s Manual for the setting procedure to obtain the alert information from the gateway.
The alert report consists of the list of parameter names as shown Table 7.3.

Table 7.3 Contents of Alert Report

Parameter name	Description
DetectObjectTLPort	Alert detection port UAP (0xF0B2) fixed
DetectObject	Alert detection block UAPMO (1) fixed
DetectTime	Time stamp
AlertDirection	1: generated, 0: clear
AlertPriority	Alert priorities set by users
AlertType	Alert types, see 8.4 Self-Diagnostics
AlertValue	NAMUR107 category 0:Failure, 1:checkFunction, 2:OffSpec, 3:MaintenaceRequired

CAUTION

For a wireless gateway which does not support the alert report function, the alert setting in UAPMO block for the transmitter must be set to “Disable.” Note that YFGW710 field wireless integrated gateway does not have the alert report function.

Table 7.4 Diagnostic Results Summary

Diagnostic Status Contents	Alert Type	NAMUR NE107 Categor	Diagnostic Status Detail	Description
Faults in electronics	127	F	AMP ERR	Amplifier failure
			MEMORY ERR	Memory failure
			FlashROM ERR	FlashROM failure
			ADC ERR	ADC failure
Faults in sensor or actuator element	126	F	SENSOR1 FAILURE	Sensor 1 burnout
			SENSOR2 FAILURE **	Sensor 2 burnout
			TERM SNS FAILURE	CJC sensor burnout
Installation, calibration problem	125	C	SENSOR1 SPAN ADJ ERR	Sensor 1 faulty input of span adjustment value
			SENSOR1 ZERO ADJ ERR	Sensor 1 faulty input of zero adjustment value
			SENSOR2 SPAN ADJ ERR **	Sensor 2 faulty input of span adjustment value
			SENSOR2 ZERO ADJ ERR **	Sensor 2 faulty input of zero adjustment value
Out of service	124	C	AI1 O/S MODE	AI1 O/S Mode
			AI2 O/S MODE **	AI2 O/S Mode
Outside sensor limits	123	O	---	---
Environmental conditions out of device specification	122	O	SENSOR1 TEMP HI	Sensor 1 temperature higher limit scale out
			SENSOR1 TEMP LO	Sensor 1 temperature lower limit scale out
			SENSOR2 TEMP HI **	Sensor 2 temperature higher limit scale out
			SENSOR2 TEMP LO **	Sensor 2 temperature lower limit scale out
			AMB TEMP HI	Ambient temperature higher limit scale out
			AMB TEMP LO	Ambient temperature lower limit scale out
Fault prediction: Maintenance required	121	M	FIRMWARE CONDITION CHECK	Firmware internal error
Power is critical low: maintenance need short-term	120	M	CRITICAL LOWBAT **	Deep sleep due to low battery
			LOWBAT FOR DEEPSLEEP *	Deep sleep due to low battery
Power is low: maintenance need mid-term	119	M	LOWBAT	Low battery
Software update incomplete	118	C	---	---
Simulation is active	117	C	AI1 SIMULATE MODE	AI1 SIMULATE Mode
			AI2 SIMULATE MODE **	AI2 SIMULATE Mode

* : Applicable for single input type with integral antenna, Amplifier housing code 7.
** : Applicable for dual input type with detachable antenna, Amplifier housing code 8 and 9.

7.4.3 Checking with Integral Indicator

NOTE

If an error is detected by running self-diagnostics, an error number is displayed on the integral indicator. If there is more than one error, the error number changes at three-second intervals. See table 8.4 regarding the alarm codes.

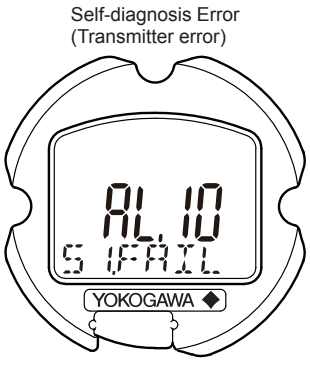


Figure 7.4 Error Check with Integral Indicator

8. Maintenance

8.1 General

Maintenance of the transmitter is easy due to its modular construction. This chapter describes the procedures for calibration, adjustment, and the disassembly and reassembly procedures required for component replacement.

Transmitters are precision instruments. Please carefully and thoroughly read the following sections for information on how to properly handle them while performing maintenance.

IMPORTANT

- As a rule, maintenance of this transmitter should be done in a shop that has all the necessary tools.
- The CPU assembly , RF assembly and LCD board assembly contain sensitive parts that can be damaged by static electricity. Take precautions such as using a grounded wrist strap when handling electronic parts or touching the board circuit patterns. Also be sure to place the removed CPU assembly , RF assembly or and LCD board assembly into a bag with an antistatic coating.

8.2 Calibration Instruments Selection

Table 8.1 lists the instruments that can be used to calibrate a transmitter. When selecting an instrument, consider the required accuracy level. Exercise care when handling these instruments to ensure they maintain the specified accuracy

8.3 Calibration Procedure

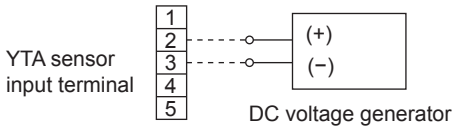
Use the procedure below to check instrument operation and accuracy during periodic maintenance or troubleshooting.

1) Insert the battery pack and then perform provisioning to have the transmitter join the Field Wireless Network or preparing the infrared communication for calibration.
2) Set the update period to 1 second using the field wireless configuration tool to set continuous for the transmitter.
3) Connect the devices as shown in Figure 8.1 and allow the transmitter to warm up for at least 5 minutes.

Table 8.1 Instruments Required for Calibration

Name	Yokogawa-recommended Instrument	Remarks
Provisioning device tool	• FieldMate (R2.02.01 or later) • Provisioning Device Tool • Infrared Adapter certified by Yokogawa Supplier: ACTiSYS Product name: IrDA InfraRed USB Adaptor Product number: IR224UN	
Field wireless configuration tool	• Field Wireless Integrated Gateway attached Software Field Wireless Configurator Field Wireless Management Tool • Field Wireless System related Product Plant Resource Manager (PRM) (R3.05 or later) • Device Configuration Tool via ISA100.11a Wireless Communication FieldMate (R2.02.01 or later) DeviceFile (R3.01.01 or later) • Device Configuration Tool via Infrared Communication FieldMate (R2.03.00 or later) DeviceFile (R3.02.01 or later)	
Universal calibrator	• Model 9100 type	For calibration of DC voltage or thermocouple input)
Variable resistor	• 279301 type 6-dial variable resistor (accuracy: ±0.005%)	For calibration of resistance thermometer (RTD) input

Example of wiring for thermocouple or DC voltage input



Example of wiring for RTD 4-wire type

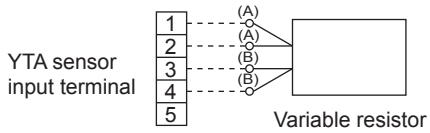


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Figure 8.1 Example of wiring for calibration equipment

4) Calibration Procedure
   a) For DC voltage input
      With a voltage generator, deliver input signals corresponding to 0, 25, 75, or 100% of the input span to the temperature transmitter.
   b) For thermocouple input
      Since this instrument is equipped with a cold junction compensating function, use a cold junction compensating function in universal calibrator in order to compensate for this function upon calibration. According to the reference millivolt table for thermocouple, obtain millivolt corresponding to 0, 25, 50, 75, or 100% of the span, and use that power as the input value, then deliver it from the universal calibrator to the temperature transmitter. Check the output value for that input value.
   c) For resistance thermometer (RTD) input
      Using a thermometer resistor as input, calibration of the temperature transmitter is carried out via a 4-core wire connection. As defined in the reference resistor value table of the resistance thermometer (RTD), obtain resistance values corresponding to 0, 25, 50, 75 or 100% of the span, and use the obtained resistance as the input value, then deliver it to the temperature transmitter by means of a variable resistor. Check the output value for that input value.

   Apply a specified input signal following steps a) to c) above. If the output signal is outside the accuracy range, perform output adjustment using the device configuration tool. For details on how to perform adjustment, refer to subsection 7.3.13 Input calibration.

8.4 Disassembly and Assembly

CAUTION

Precautions for the intrinsic safety explosion prevention type instrument
Intrinsic safe type transmitters must be, as a rule, removed to a non-hazardous area for maintenance and be disassembled and reassembled to the original state. Check the insulation, and execute Insulation Test, when it is disassembled and reassembled to the original state.
Refer to section 2.7 “Insulation Resistance and Dielectric Strength Test” for details of Resistance Test.
Refer to "Precautions for the intrinsic safety explosion prevention type instrument" in the end of this manual of details.

IMPORTANT

- Perform the provisioning when replacing the RF assembly. Refer to 6.4 Connecting to the Field Wireless Network for details.
- Replace the batteries and perform the parameter settings when replacing the CPU assembly. Refer to 8.4.5 Replacing the Batteries.

This section describes procedures for disassembly and reassembly for maintenance and component replacement.

CAUTION

Always remove the battery pack and shut off before disassembly. Use proper tools for all operations.

Table 8.2 Tools for Disassembly and Reassembly

Tool	Quantity	Remarks
Phillips screwdriver	1	JIS B4633, No. 2
Slotted screwdriver	1	
Allen wrenches	3	JIS B4648 One each, nominal 3, 4 and 2.5 mm Allen wrenches
Wrench	1	Width across flats, 17 mm
Torque wrench	1	
Adjustable wrench	1	
Socket wrench	1	Width across flats, 16 mm
Socket driver	1	Width across flats, 5.5 mm
Tweezers	1	

8.4.1 Replacing the Integral Indicator

This subsection describes the procedure for replacing an integral indicator. (See figure 8.2)

■ **Removing the Integral Indicator**

1) Remove the cover.
2) While supporting the integral indicator with one hand, loosen its two mounting screws.
3) Dismount the LCD board assembly from the RF assembly.
   When doing this, carefully pull the LCD board assembly straight forward so as not to damage the connector pins between it and the RF assembly.

■ **Attaching the Integral Indicator**

1) Align both the LCD board assembly and RF assembly connectors and engage them.
2) Insert and tighten the two mounting screws.
3) Replace the cover.

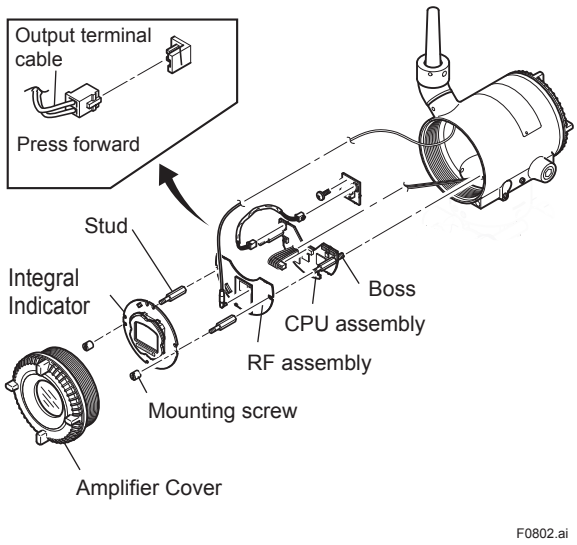


Figure 8.2 Removing and Attaching integral Indicator and CPU Assembly

8.4.2 Replacing the RF Assembly

This subsection describes how to replace the RF assembly (see Figure 8.2).

■ **Removing the RF assembly**

1) Remove the cover.
2) Remove the Integral indicator (refer to subsection 8.4.1).
3) Remove the two stud bolts by using a socket driver (width across flats: 5.5 mm)
4) Disconnect the RF assembly from the CPU assembly. When doing this, carefully pull the RF assembly straight forward so as not to damage the connector pins between it and the CPU assembly.
5) Disconnect the antenna cable that connects the CPU assembly and the antenna.

NOTE

Be careful not to apply excessive force to the RF assembly and the connector of the antenna cable when removing it.

■ **Mounting the RF assembly**

1) Connect the antenna cable between the RF assembly and the antenna.
2) Align both the RF assembly and CPU assembly connectors and engage them.
3) Tighten the two stud bolts.
4) Mount the Integral indicator (refer to subsection 8.4.1).
5) Replace the cover.

8.4.3 Replacing the CPU Assembly

This subsection describes how to replace the CPU assembly (see Figure 8.2).

■ **Removing the CPU assembly**

1) Remove the cover.
   Remove the Integral indicator and the RF assembly (refer to subsections 8.4.1 and 8.4.2).
2) Disconnect the power cable. When doing this, lightly press the side of the CPU assembly connector and pull the cable connector to disengage (see the upper left of Figure 8.2).
3) Use a socket driver (width across flats, 5.5 mm) to loosen the two bosses.
4) Carefully pull the CPU assembly straight forward to remove it.
5) Disconnect the flat cable (cable with white connector at the end) that connects the CPU assembly and the printed circuit assembly (fixed) in bottom of the amplifier case.

NOTE

Be careful not to apply excessive force to the CPU assembly when removing it.

■ **Mounting the CPU assembly**

1) Connect the flat cable (with white connector) between the CPU assembly and the printed circuit assembly (fixed) in bottom of the amplifier case.
2) Connect the power cable to the CPU assembly.

NOTE

Insert the cable in the connector firmly.
Make certain that the cables do not get pinched between the case and the edge of the CPU assembly.

3) Insert the CPU assembly straight onto the post in the amplifier case.
4) Tighten the two bosses. Mount the RF assembly, and the Integral indicator (refer to subsections 8.4.1 and 8.4.2).
5) Replace the cover.

8.4.4 Replacing the Battery Pack

Regarding the transmitter with intrinsically safe approval, the battery pack can be replaced without removing the device in hazardous area.

■ **Removing**

1) Remove the terminal box cover.
2) Loosen the two battery pack mounting screws (see Figure 8.3).
3) Pull the battery pack.

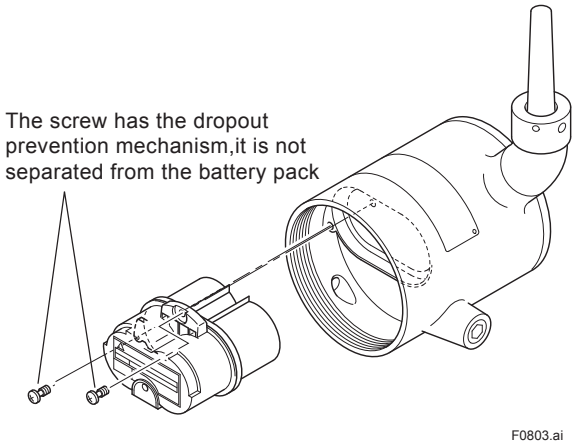


Figure 8.3 Removing the Battery Pack

■ **Remounting**

1) Insert the new battery pack lightly.
2) Push the center of the battery pack and insert it securely.
3) Tighten the two battery pack mounting screws to a torque of approximately 0.7 N•m.
4) Replace the terminal box cover.

8.4.5 Replacing the Batteries

The batteries in the battery pack can be replaced. Batteries are not installed when shipped from the factory. Assemble the battery pack as follows.

WARNING

Be sure to replace the batteries or disassemble and assemble the battery pack in a non-hazardous area. Doing so in an hazardous area could cause an explosion.

CAUTION

When replacing the batteries, be sure to replace the two batteries at the same time and do not use an old and a new battery together..

■ **Disassembling**

1) Loosen the two battery case mounting screws.
2) Separate the battery case into two parts.
3) Remove the old batteries.

■ **Assembling**

1) Insert new batteries into the battery case.
2) Attach the two parts of the battery case to each other.
3) Tighten the two battery case mounting screws to a torque of approximately 0.7 N•m.

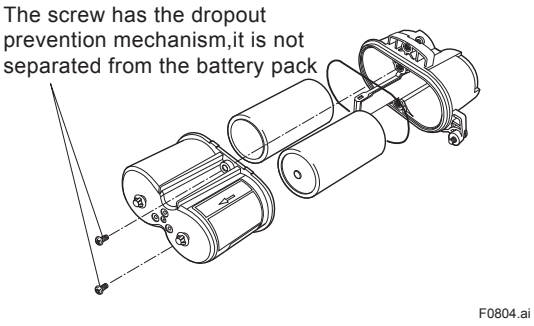


Figure 8.4 Disassembling the Battery Pack

8.4.6 Handling Batteries

This battery pack uses two primary lithium/ thionyl chloride batteries. Each battery contains approximately 5 grams of lithium, for a total of 10 grams in each pack. Under normal conditions, the battery materials are self-contained and are not reactive as long as the batteries and the pack integrity are maintained. Care should be taken to prevent thermal, electrical or mechanical damage. Protect the electrode of the battery pack to avoid rapid electrical discharge. Discharged a battery may lead to fluid leakage and excessive heat. Batteries should be stored in a clean and dry area. For maximum battery life, storage temperature should not exceed 30°C.

WARNING

Handling the battery pack
The following precautions must be observed in order to safely and effectively use a battery pack. Improper use may lead to fluid leakage, excessive heat, ignition, or explosion.

- Never charge it.
- Do not short-circuit it.
- Do not disassemble, transform, or modify it.
- Do not heat it or throw it into a fire.
- Do not soak it in fresh water or seawater.

CAUTION

Observe the following precautions for the safe disposal of batteries.

- Do not incinerate the battery, and do not expose it to a high temperature of 100°C or more. This may lead to fluid leakage or explosion.
- Dispose of the battery according to laws and regulations.

Use the following dedicated parts for the battery pack and batteries.

■ Battery pack
Part number: F9915NQ (with batteries)
Part number: F9915NK (without batteries)

■ Batteries
Part number: F9915NR
Alternatively, Tadiran TL-5930/S batteries may be purchased and used.

Transportation of products containing lithium batteries

Batteries used for this transmitter contain lithium. Primary lithium batteries are regulated in transportation by the U.S. Department of Transportation, and are also covered by the International Air Transport Association (IATA), the International Civil Aviation Organization (ICAO), and the European Ground Transportation of Dangerous Goods (ARD). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Consult current regulations and requirements before shipping. When transporting this transmitter with the battery pack inserted, keep it in deep sleep mode in order to conserve battery power. For details on how to switch to deep sleep mode, refer to subsection 7.3.12 “Switching to Deep Sleep Mode.”

Procedure to replace and dispose of the batteries of the product

This is an explanation about the new EU Battery Directive(DIRECTIVE 2006/66/EC).
This directive is only valid in the EU.
Batteries are used for this product.
When you remove batteries from this product and dispose them, discard them in accordance with domestic law concerning disposal.
Take a right action on waste batteries, because the collection system in the EU on waste batteries are regulated.

Battery type: Primary lithium-thionyl chloride battery

Crossed-out dustbin symbol

NOTE

The symbol (see above), which is marked on the batteries, means they shall be sorted out and collected as ordained in ANNEXII in DIRECTIVE 2006/66/EC

Procedure to remove the batteries safely

Refer to subsection 8.4.4 “Replacing the Battery Pack” and subsection 8.4.5 “Replacing the Batteries.”

8.5 Troubleshooting

If any abnormality appears in the measured values, use the troubleshooting flow chart below to isolate and remedy the problem. Since some problems have complex causes, these flow charts may not identify all. If you have difficulty isolating or correcting a problem, contact Yokogawa service personnel.

8.5.1 Basic Troubleshooting Flow

First determine whether the process variable is actually abnormal or a problem exists in the measurement system.

If the problem is in the measurement system, isolate the problem and decide what corrective action to take.

This transmitter is equipped with a self-diagnostic function which will be useful in troubleshooting, and the transmitter equipped with an integral indicator will show an alarm code as a result of self-diagnosis.

See subsection 8.5.3 for the list of alarms.

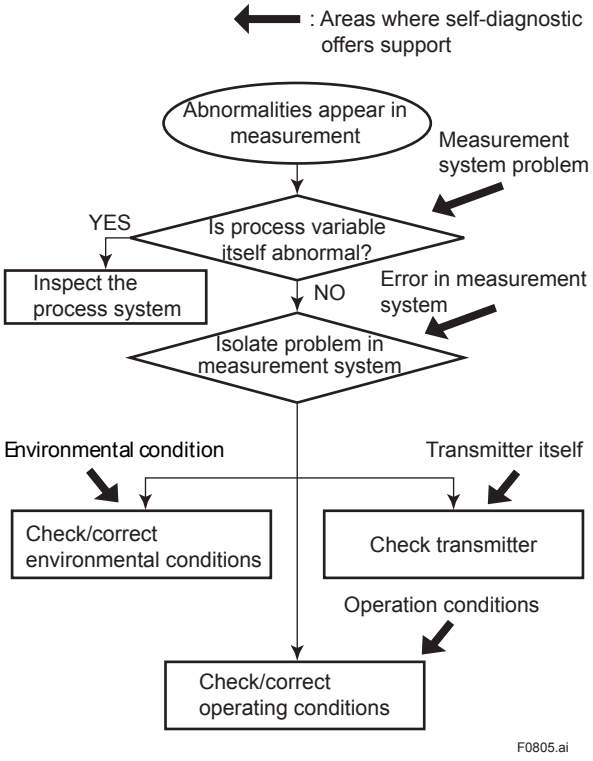


Figure 8.5 Basic Troubleshooting Flow

8.5.2 Example of Troubleshooting Flow

The following shows an example of the flow for troubleshooting.

Refer to this example and Table 8.3 “Problems, Causes and Countermeasures” and locate the problem and take the corresponding countermeasure.

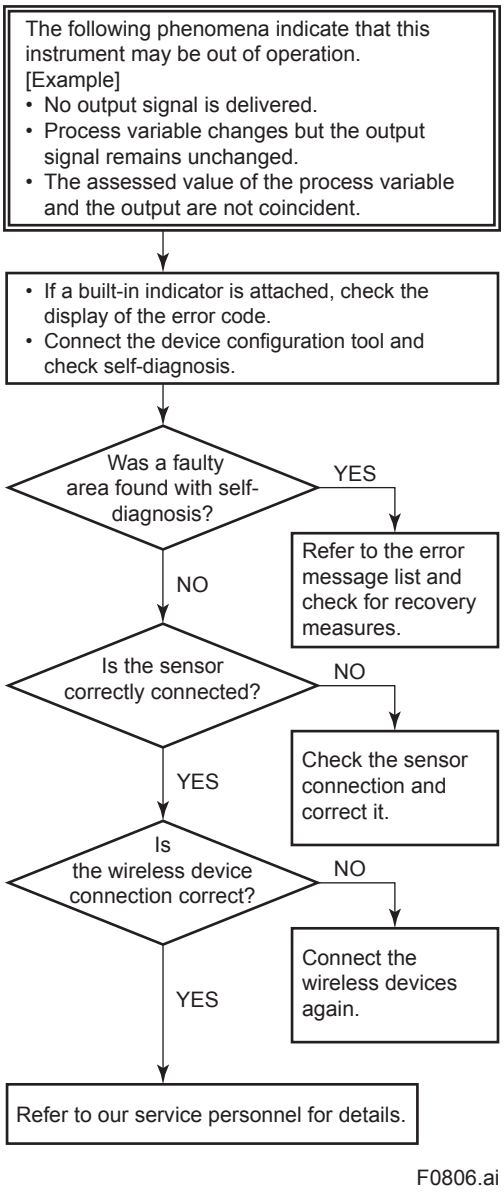

The following phenomena indicate that this instrument may be out of operation.
[Example]
• No output signal is delivered.
• Process variable changes but the output signal remains unchanged.
• The assessed value of the process variable and the output are not coincident.
• If a built-in indicator is attached, check the display of the error code.
• Connect the device configuration tool and check self-diagnosis.
Was a faulty area found with self-diagnosis?
YES
Refer to the error message list and check for recovery measures.
NO
Is the sensor correctly connected?
NO
Check the sensor connection and correct it.
YES
Is the wireless device connection correct?
NO
Connect the wireless devices again.
YES
Refer to our service personnel for details.
F0806.ai

Figure 8.6 Example of Troubleshooting Flow

Table 8.3 Cause and Countermeasure

Observed Problems	Possible Cause	Countermeasure	Related Parameter
Output fluctuates greatly.	Input adjustment by user was not correctly done.	Set or clear the user adjustment value.	• Lin Type • Sensor Range
	Damping adjustment is not correct.	Set the damping adjustment to 0.	• Process Value Filter Time
Transmitter outputs fixed current.	Input adjustment by user was not correctly done.	Set or clear the user adjustment value.	• Lin Type • Sensor Range
	The simulation function is set to ON.	Set the simulation function to OFF.	• Simulate Switch
Output is reversed.	The lower limit value is greater than the upper limit value.	Set the correct value to the upper limit value and the lower limit value.	• Lin Type • Sensor Range • Cal Point Lo • Cal Point Hi
Parameters cannot be changed.	The transmitter is in write protect status.	Release write protect.	• UAP Option • Hardware Write Protect

8.5.3 Errors and Countermeasures

Table 8.4 Error Message Summary

Integral indicator	Factory NAMUR category	Bit	Diagnostic Status	Diagnostic Status Detail	Cause	Release/ recovery conditions (except restart)	Output Operation	Action
AL.02 AMP. ERR*2	F	Bit 27	Faults in electronics	AMP ERR	Amplifier temperature sensor error	None	The output is fixed to ±99999°C. The sign is dependent on the burnout switch at the LCD board or Burn Out Type parameter*4.	Replace the amplifier.
				MEMORY ERROR	Amplifier memory failure	None	Same as above	Replace the amplifier.
				ADC ERROR	Amplifier AD converter failure	None	Same as above	Replace the amplifier.
AL.03 FUP. ERR*2				Firm Update ERR	Firmware update write error	None	----	Replace the amplifier.
AL.10 S1.FAIL*2	F	Bit 26	Faults in sensor or actuator element	SENSOR1 FAILURE	Sensor 1 burnout	None	The output is fixed to ±99999°C. The sign is dependent on the burnout switch at the LCD board or Burn Out Type parameter*4.	Replace the sensor 1.
AL.12 RJ.FAIL*2				TERM SNS FAILURE	CJC sensor burnout	None	Operable at the CJC value (0°C).	Replace the CJC sensor.

Integral indicator	Factory NAMUR category	Bit	Diagnostic Status	Diagnostic Status Detail	Cause	Release/ recovery conditions (except restart)	Output Operation	Action
AL.20 LOWBAT *3	M	Bit 19	Power is low: maintenance need mid-term	LOWBAT	Low remaining battery voltage	None	Normal action	Replace the batteries.
		Bit 20 *4	Power is critical low: maintenance need short - term	CRITICAL LOWBAT	Low remaining battery voltage	None	Normal action	Replace the batteries.
		Bit 20 *5	Power is critical low: maintenance need short - term	LOWBAT FOR DEEPSLEEP	Low remaining battery voltage causes switching to deep-sleep mode.	None	Normal action, but power turns off 15 minutes after alarm is generated.	Replace the batteries.
AL.23 FIRM.C	M	Bit 21	Fault prediction: Maintenance required	FIRMWARE CONDITION CHECK	Firmware internal error	None	Normal action	Restart.
AL.40 S1.OVR	O	Bit 22	Environmental conditions out of device specification	SENSOR1 TEMP HI	The temperature of sensor 1 is higher than the temperature specified in the Sensor Range parameter.	Recovers when the temperature falls within the range.	Normal action	Check the sensor type setting and connection method.
				SENSOR1 TEMP LO	The temperature of sensor 1 is lower than the temperature specified in the Sensor Range parameter.	Recovers when the temperature rises within the range.	Normal action	Check the sensor type setting and connection method.
AL.41 S2.OVR *4				SENSOR2 TEMP HI	The temperature of sensor 2 is higher than the temperature specified in the Sensor Range parameter.	Recovers when the temperature falls within the range.	Normal action	Check the sensor type setting and connection method.
				SENSOR2 TEMP LO	The temperature of sensor 2 is lower than the temperature specified in the Sensor Range parameter.	Recovers when the temperature falls within the range.	Normal action	Check the sensor type setting and connection method.
AL.45 AMB. OVR	O	Bit 22	Environmental conditions out of device specification	AMB TEMP HI	The ambient temperature is higher than +85°C.	Recovers when the temperature falls below +85°C.	Normal action	Check the temperature in the vicinity of the transmitter.
				AMB TEMP LO	The ambient temperature is lower than -40°C.	Recovers when the temperature rises above -40°C.	Normal action	Check the temperature in the vicinity of the transmitter.

Integral indicator	Factory NAMUR category	Bit	Diagnostic Status	Diagnostic Status Detail	Cause	Release/ recovery conditions (except restart)	Output Operation	Action
AL.50 S1.SPAN	C	Bit 25	Faults in sensor or actuator element	SENSOR1 SPAN ADJ ERR	Sensor 1 input adjustment range error	Recovers when the input is within the range.	Normal action	Check the input adjustment setting.
AL.51 S1.ZERO				SENSOR1 ZERO ADJ ERR	Sensor 1 input adjustment value error	Recovers when the input value is a normal value.	Normal action	Check the input adjustment setting.
AL.52 S2.SPAN *4				SENSOR2 SPAN ADJ ERR	Sensor 2 input adjustment range error	Recovers when the input is within the range.	Normal action	Check the input adjustment setting.
AL.53 S2.ZERO *4				SENSOR2 ZERO ADJ ERR	Sensor 2 input adjustment value error	Recovers when the input value is a normal value.	Normal action	Check the input adjustment setting.
AL.60 AI1.OS		Bit 24	Out of service	AI1 O/S MODE	AI1 block is O/S mode.	Recovers when the mode target of AI1 block is other than O/S.	Hold	Check the AI1 block setting.
AL.61 AI2.OS*4				AI2 O/S MODE	AI2 block is O/S mode.	Recovers when the mode target of AI1 block is other than O/S.	Hold	Check the AI2 block setting.
AL.64 AI1.SIM		Bit 17	Simulation is active	AI1 SIMULATE MODE	Simulate Switch of the AI1 block is enabled	Recovers when the Simulate Switch of AI1 block is set to DISABLE.	Normal action	Check the AI1 block setting.
AL.65 AI2.SIM*4				AI2 SIMULATE MODE	Simulate Switch of the AI2 block is enabled	Recovers when the Simulate Switch of AI2 block is set to DISABLE.	Normal action	Check the AI2 block setting.

1: "Factory NAMUR category" refers to the four categories (C: Check function, M: Maintenance required, F: Failure, and O: Off specification) according to NAMUR NE107.

* NAMUR NE107 "Self-Monitoring and Diagnosis of Field Devices"

*2: When the device detects "AL02 AMP.ERR," "AL03 FUP.ERR," "AL10 S1.FAIL," "AL11 S2.FAIL," and "AL12 RJ.FAIL", the LCD display stays on regardless of the status in LCD mode.

*3: When the ambient temperature is higher than 60°C, AL.70 may be generated despite the indication of Energy Left shows sufficiently remained. However, it does not affect the device operation. This is caused by the change of battery inner status with extremely low power consumption under high temperature environment. It is recommended to set the data updating period to 15 seconds or shorter.

*4: Applicable for dual input type with detachable antenna, Amplifier housing code 8 and 9.

*5: Applicable for single input type with integral antenna, Amplifier housing code 7.

9. Parameter Summary

Table 9.1 Parameter Summary

<table>
<tr><th>Object ID</th><th>Attribute ID</th><th>Label</th><th>Description</th><th>Default value</th><th>Handling</th></tr>
<tr><td rowspan="15">1.
UAPMO
block</td><td>1</td><td>Version Revision</td><td>Indicates the application revision of YTA. This revision changes when the application software is downloaded.</td><td>---</td><td>R</td></tr>
<tr><td>10</td><td>Static Revision</td><td>Indicates the revision level of the fixed parameters of UAP. Used, for example, to check whether parameters have been changed.</td><td>0</td><td>R</td></tr>
<tr><td>64</td><td>Identification Number</td><td>Indicates the vendor ID, model ID, and revision of the device.</td><td>---</td><td>R</td></tr>
<tr><td>65</td><td>CTS Version</td><td>Indicates the version of the communication stack test system (CTS).</td><td>0</td><td>R</td></tr>
<tr><td>66</td><td>ITS Version</td><td>Indicates the version of the interoperability test system (ITS).</td><td>0</td><td>R</td></tr>
<tr><td>67</td><td>Diagnostic Status</td><td>Indicates the diagnostic results of the device based on the NAMUR NE107*1 model.
Setting Enable diagnostic status configuration in UAP Option to Enable allows turning OFF and ON the display of the diagnostic results for each summary, and changing Categorize. For Categorize at the time of shipment, refer to tables 8.3 and 10.2.</td><td>---</td><td>R</td></tr>
<tr><td>68</td><td>UAP Option</td><td>Allows setting the Diagnostic Status and write protection of UAP.
Software write protect
1: On, 0: Off
Enable hardware write protect
1: Enable, 0: Disable (default)
Enable diagnostic status configuration
1: Enable, 0: Disable (default)
The following table shows the relationship between the hardware write protection and software write protection.
<table>
<tr><th>Enable hardware write protect</th><th>Hardware write protect</th><th>Software write protect</th><th>Write protect</th></tr>
<tr><td>Disable</td><td>Off or On</td><td>Off</td><td>No</td></tr>
<tr><td>Disable</td><td>Off or On</td><td>On</td><td>Protected</td></tr>
<tr><td>Enable</td><td>Off</td><td>Off or On</td><td>No</td></tr>
<tr><td>Enable</td><td>On</td><td>Off or On</td><td>Protected</td></tr>
</table></td><td>0</td><td>W</td></tr>
<tr><td>69</td><td>Diagnostic Switch</td><td>Allows setting On/Off for each summary of Diagnostic Status when Enable diagnostic status configuration in UAP Option is set to Enable.</td><td>On</td><td>W</td></tr>
<tr><td>70</td><td>Diagnostic Configuration</td><td>Allows Categorize for each summary of Diagnostic Status when Enable diagnostic status configuration in UAP Option is set to Enable.</td><td>Refer to Table 9.2.</td><td>W</td></tr>
<tr><td>102</td><td>Diagnostic Status Detail</td><td>Detailed information on Diagnostic Status. For Categorize at the time of shipment, refer to Table 9.2.</td><td>Refer to Table 9.2.</td><td>R</td></tr>
<tr><td>103</td><td>Energy Left</td><td>Indicates the number of days of remaining battery life assuming ambient temperature condition as 23 degrees Celsius. The unit is day.</td><td>---</td><td>R</td></tr>
<tr><td>104</td><td>Reset Energy Left</td><td>Resets the remaining battery power calculation to restore it to a remaining battery power calculation which is based on new batteries.
0 = Continue
1 = Reset</td><td>0 (reading value is always 0)</td><td>W</td></tr>
<tr><td>105</td><td>Power Supply Status</td><td>Indicates remaining battery life and power supply of device
0 – line powered
1 – battery powered, greater than 75% remaining capacity
2 – battery powered, between 25% and 75% remaining capacity
3 – battery powered, less than 25% remaining capacity</td><td>---</td><td>R</td></tr>
</table>

Note: TSAP ID is 2.

Object ID	Attribute ID	Label	Description	Default value	Handling
1. UAPMO (continued)	106	EH Type *2	Available to write note into this parameter.	---	W
	107	Power Supply Voltage *2	Indicates the measured power supply voltage (V).	---	R
	110	Hardware Write Protect	Allows recognizing the status of the hardware write protection switch. 0: Switch OFF 1: Switch ON	---	R
	111	Radio Silence	Repeats a cycle of a 1-hour pause and 6-minute search if the instrument cannot join the network after a time specified in Radio Silence has elapsed. When 0 is set, the Radio Silence is invalid.	28800	W
	112	Simulation Active Alert*2	The On/Off or priority for Simulation Active Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	113	Soft Update incomplete Alert*2	The On/Off or priority for Soft Update incomplete Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15 Not available for YTA.	1. TRUE 2. 15	W
	114	Power low Alert*2	The On/Off or priority for Power low Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	115	Power Critical low Alert*2	The On/Off or priority for Power Critical low Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	116	Fault prediction Alert*2	The On/Off or priority for Fault prediction Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15 Not available for YTA.	1. TRUE 2. 15	W
	117	Environmental conditions Alert*2	The On/Off or priority for Environmental conditions Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	118	Outside sensor limits Alert*2	The On/Off or priority for Outside sensor limits Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	119	Out of service Alert*2	The On/Off or priority for Out of service Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	120	Callibration problem Alert*2	The On/Off or priority for callibration problem Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	121	Faults Sensor or actuator Alert*2	The On/Off or priority for Faults Sensor or actuator Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	122	Faults Electronics Alert*2	The On/Off or priority for Faults Electronics Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 1	1. TRUE 2. 15	W

Object ID	Attribute ID	Label	Description	Default value	Handling
1. UAPMO (continued)	123	Faults process influence Alert*2	The On/Off or priority for Faults process influence Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15 Not available for YTA.	1. TRUE 2. 15	W
	124	Faults non-compliance Alert*2	The On/Off or priority for Faults non-compliance Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15 Not available for YTA.	1. TRUE 2. 15	W
	125	Other faults Alert*2	The On/Off or priority for Other faults Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15 Not available for YTA.	1. TRUE 2. 15	W
2. UDO block	2	DESCRIPTION	Indicates the version and model information of the downloaded data.	---	R
	3	STATE	Indicates the present transition state.	---	R
	5	MAX_BLOCK_ SIZE	Maximum block size. This value is smaller than the maximum data size of APDU.	---	R
	14	LAST_BLOCK_ DOWNLOADED	Indicates the last downloaded block number. 0 means that no block has been downloaded.	---	R
	16	ERROR_CODE	Indicates the error codes for DLError. 0 = noError 1 = Timeout 2 = ClientAbout 64 = Apply failure	---	R
3. CO block	1	REVISION	Indicates the version level of COMM_ENDPOINT, etc.	---	R
	2	COMM_ ENDPOINT	Indicates the Endpoint information. The following shows the components. 1.Network address of remote endpoint 2.Transport layer port at remote endpoint 3.Object ID at remote endpoint 4.Stale data limit 5.Data publication period 6.Ideal publication phase 7.PublishAutoRetransmit 8.Configuration status	---	W
	3	COMM_ CONTRACT	Indicates the Contract information. The following shows the components. 1.ContractID 2.Contract_Status 3.Actual_Phase	---	R
	4	PUB_ITEM_MAX	Maximum PUB_ITEM value	---	R
	5	PUB_ITEM_NUM	PUB_ITEM number	---	R
	6	PUB_ITEM	Indicates the PUB_ITEM information. The following shows the components. 1.ObjectID 2.AttributeID 3.AttributeIndex 4.Size	---	W

Object ID	Attribute ID	Label	Description	Default value	Handling
4. TRANSDUCER block	1	Tag Description	Memo field available to write anything.	Transducer	W
	2	Model	Indicates the model name of the transmitter.	---	R
	3	Serial Number	Indicates the device number of the transmitter.	---	R
	4	Burn Out*3 Hardware Burn Out Switch*2	Indicates the direction of the burnout switch on the integral indicator. (Burnout Low / Burnout High)	Burn out High	R
	5	Wireless Status	Indicates the wireless communication status 1.Indicates either the initial Idle status or Join status. (Idle status / Join status) 2.Indicates whether Contract (Pub) has been established. (Not established / Established) 3.Indicates whether Contract (R/W) has been established. (Not established / Established)	1. Idle status 2. Not established 3. Not established	R
	6	Display Selection	Selects the LCD display 1.Indicates the display status of the AI1/AI2 PV value. (Displayed / Not displayed)	Displayed	W
	7	LCD Mode	Selects the LCD mode. 1.Indicates the On/Off mode. (Off / Intermittent) 2.Indicates whether or not Continue. (Continuous Off / Continuous On) 3.Indicates the bar graph display (Bar graph: Not displayed / Bar graph: Displayed.)	1. Off 2. Continuous Off 3. bar graph displayed	W
	8	YTA Option	Indicates the optional function supported by the device. This cannot be changed by the user.. 1.Indicates the unit system used. (SI system / Other)	Specify when ordering	R
	9	Special Cmd	Special function parameter. 0.Initial value at the time of reading (None) 1.Squawk mode 2.Deep-sleep mode To start from the deep-sleep mode, either remove and reinsert the battery pack or use the provisioning device tool or the device configuration tool via infrared communication.	0	W
	11	Power Saving Mode *2	Selects the power saving mode 0.Off (Disable) 1.On (Enable)	1	W
	12	Mesurement Rate *2	Indicates the measurement period of process values.	30 seconds	R
	14	LCD Intermittetnt Time *2	Set the time to turn off display on the LCD indicator. Unit: second	60 seconds	W
5. AI1 block 6. AI2 block*2	1	Process Value	AI1/AI2 is a temperature output object. Indicates the primary analog value (or corresponding process value) and status used to execute this function. Allows updating data by specifying this for the Concentrator object. 1.Value: AI1/AI2 output value. 2.Status: Indicates the status of the AI1/AI2 output value.	1. --- 2. ---	W
	2	Mode	A universal parameter to indicate the block's operation status. O/S, Auto, and Man can be selected. 1.Target: Specifies the AI1/AI2 mode. 2.Actual: Indicates the present AI1/AI2 mode. 3.Permitted: Indicates the mode that can be specified in Target. 4.Normal: Indicates the AI1/AI2 normal status mode.	1. Target = Auto 2. Actual = Auto 3. Permitted = Auto | Manual | OOS 4. Normal = Auto	W
	3	Concentrator OID	Indicates the Concentrator object value that corresponds to the data update of the PV value.	---	R

Object ID	Attribute ID	Label	Description	Default value	Handling
5. AI1 block 6. AI2 block*2 (continued)	4	Scale	Allows specifying the upper or lower limit for the PV scaling, unit code, etc. 1.EU at 100%: Indicates the upper limit to the PV value. 2.EU at 0%: Indicates the lower limit to the PV value. 3.Units Index: Indicates the set unit used for the PV value. 4.Decimal: Indicates the number of digits after the decimal point to display on the LCD unit.	1.EU at 100% = --- 2.EU at 0% = --- 3.Units Index = °C 4.Decimal = 1	W
	26	Tag Description	A universal parameter to store the comment that describes the tag	AI1 : Temperature	W
	27	Process Value Filter Time	Allows adjusting the damping time constant for the PV value. Damping time constant set longer than update Time. Setting unit: Second.	15 sec	W
	28	Simulate Switch	A simulation function switch for the AI1/AI2 object test (Disable/ Enable)	Disable	W
	29	Transducer Value	When SIMULATE_SWITCH is set to Disable, this value is used as the input value for the AI object. The temperature value calculated from the physical value of the sensor. The Bias value is added to the temperature value	---	R
	30	Simulate Value	When SIMULATE_SWITCH is set to Enable, this value is used as the input value for the AI1/AI2 object. The input value can be changed, but technical unit is not converted to output value of the AI1/AI2 object.	0	W
	51	Lin Type	Sets the sensor type. Select any of Unused, Pt100 (IEC751), Pt200 (IEC751), Pt500 (IEC751), Type B (IEC584), Type E (IEC584), Type J (IEC584), Type K (IEC584), Type N (IEC584), Type R (IEC584), Type T (IEC584), mV, and Ohm.	---	W
	52	Bias	Adds the BIAS temperature value to the temperature value. This is set as a temperature value to which a value converted to the unit set in the Units Index of Sensor Range is added.	0	W
	53	Sensor Range	Indicates the basic information on the sensor used. 1.EU at 100%: Indicates the upper limit of the sensor set in Lin Type. 2.EU at 0%: Indicates the lower limit of the sensor set in Lin Type. 3.Units Index: Sets the unit for Transducer Value, Simulate Value, Bias, EU at 100%, EU at 0%, Reference Junction Temp and External Reference Junction Value. 4.Decimal: Unused in YTA.	1. EU at 100% = --- 2. EU at 0% = --- 3. Units Index = --- 4. Decimal = 1	W
	57	Reference Junction Temp	Indicates the terminal block temperature value for the cold junction compensation.	---	R
	58	Selection of Reference Junction	Sets the cold junction compensation when using the thermocouple sensor. 0.No cold conjunction compensation (No Reference) 1.Internal temperature value (Internal) 2.External temperature value (External)	1	W
	59	External Reference Junction Value	Sets the external temperature Sets the external temperature when setting the cold junction temperature value of the thermocouple to the external temperature value in Selection of Reference Junction.	0	W
	61	Sensor Connection	Sets the number of connections when Lin Type is the resistance temperature sensor. 0: 2Wire 1: 3Wire 2: 4Wire* *Not applicable for AI2.	---	W
	102	Sensor Serial Number	Indicates the serial number of the sensor, which corresponds to the tag assigned to the temperature sensor.	---	W

Object ID	Attribute ID	Label	Description	Default value	Handling
5. AI1 block 6. AI2 block*2 (continued)	103	Cal Point Lo	Sets the zero-point adjustment for the input adjustment (zero-gain adjustment) of the sensor. Be sure to perform adjustment with Cal Point Lo (zero-point) first.	---	W
	104	Cal Point Hi	Sets the gain-point adjustment for the input adjustment (zero-gain adjustment) of the sensor.	---	W
	105	Cal Point Clear	Resets the input adjustment value of the sensor to the factory setting.	0	W
	106	Process Value Type	Selects data to output to PV.Value. 0.% value after the scaling process is performed 1.Actual target value after the filter process is performed	0	W
	107	Reference Junction Unit	Sets the unit for Reference Junction Temp and External Reference Junction Value. Select any of °C (Celsius), K (Kelvin), °F (Fahrenheit), and °R (Rankine).	°C	W
	108	Burn Out Type*2	Sets the burnout of the PV value at the detection. 0: The direction specified by hard ware switch 1: Set to higher side 2: Set to lower side	0	W

(Note) R: Read only, W: Read and Write
(Note) "Factory NAMUR category" refers to the four categories (C: Check function, M: Maintenance required, F: Failure, and O: Off specification) according to NAMUR NE107.

*1: NAMUR NE107 "Self-Monitoring and Diagnosis of Field Devices"
*2: Applicable for dual input type with detachable antenna, Amplifier housing code 8 and 9.
*3: Applicable for single input type with integral antenna, Amplifier housing code 7.

Table 9.2 Diagnostic Status Detail

Bit	Diagnostic Status Detail	Description	Diagnostic status assignment bit	NAMUR
Diagnostic Status Detail.1				
Bit31	AMP ERR	Amplifier failure	Bit27	F
Bit30	MEMORY ERR	Memory failure	Bit27	F
Bit27	Firm Update ERR	Firmware write error	Bit27	F
Bit26	ADC ERR	ADC failure	Bit27	F
Bit23	SENSOR1 FAILURE	Sensor 1 burnout	Bit26	F
Bit22	SENSOR2 FAILURE *1	Sensor 2 burnout	Bit26	F
Bit21	TERM SNS FAILURE	CJC sensor burnout	Bit26	F
Bit16	CRITICAL LOWBAT *1	Deep sleep due to low battery	Bit20	M
Bit15	LOWBAT	Low battery	Bit19	M
Bit14	LOWBAT FOR DEEPSLEEP *2	Deep sleep due to low battery	Bit20	M
Bit11	FIRMWARE CONDITION CHECK	Internal control error detection	Bit21	M
Diagnostic Status Detail.2				
Bit31	SENSOR1 TEMP HI	Sensor 1 temperature higher limit scale out	Bit22	O
Bit30	SENSOR1 TEMP LO	Sensor 1 temperature lower limit scale out	Bit22	O
Bit29	SENSOR2 TEMP HI *1	Sensor 2 temperature higher limit scale out	Bit22	O
Bit28	SENSOR2 TEMP LO *1	Sensor 2 temperature lower limit scale out	Bit22	O
Bit27	AMB TEMP HI	Ambient temperature higher limit scale out	Bit22	O
Bit26	AMB TEMP LO	Ambient temperature lower limit scale out	Bit22	O
Bit23	SENSOR1 SPAN ADJ ERR	Sensor 1 faulty input of span adjustment value	Bit25	C
Bit22	SENSOR1 ZERO ADJ ERR	Sensor 1 faulty input of zero adjustment value	Bit25	C
Bit21	SENSOR2 SPAN ADJ ERR *1	Sensor 2 faulty input of span adjustment value	Bit25	C
Bit20	SENSOR2 ZERO ADJ ERR *1	Sensor 2 faulty input of zero adjustment value	Bit25	C
Bit15	AI1 O/S MODE	AI1 O/S Mode	Bit24	C
Bit14	AI2 O/S MODE *1	AI2 O/S Mode	Bit24	C
Bit13	AI1 SIMULATE MODE	AI1 Simulate Mode	Bit17	C
Bit12	AI2 SIMULATE MODE *1	AI2 Simulate Mode	Bit17	C

*1: Applicable for dual input type with detachable antenna, Amplifier housing code 8 and 9.
*2: Applicable for single input type with integral antenna, Amplifier housing code 7.

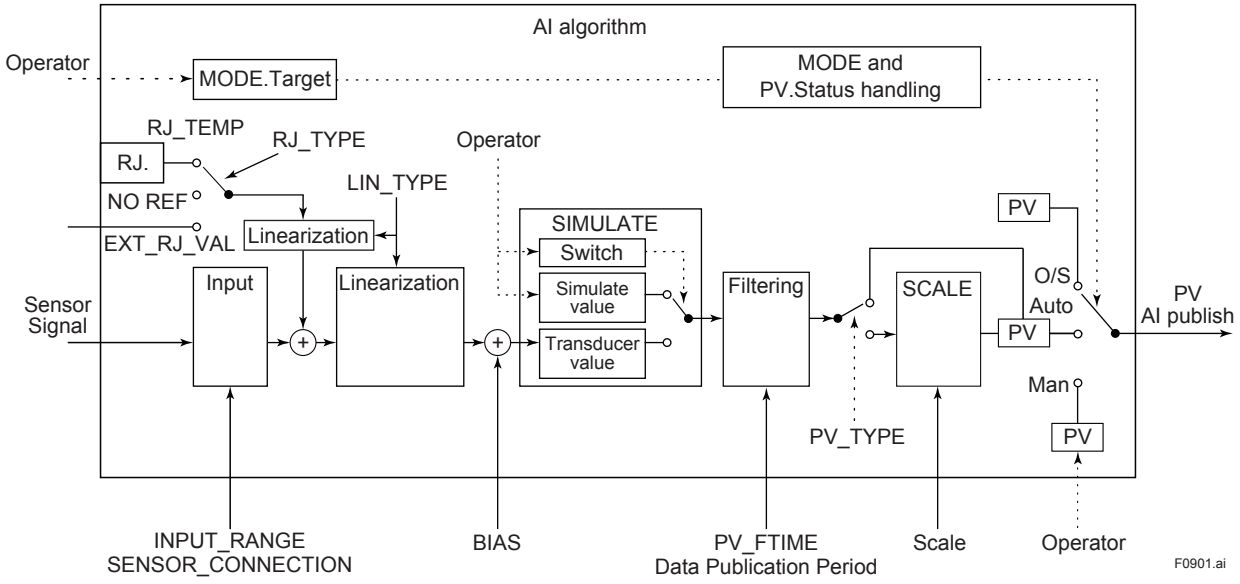


Figure 9.1 Example schema of analog input object

10. General Specifications

10.1 General Specification

Communication Protocol

ISA100.11a protocol

Data Rate

250 kbps

Frequency

2400 - 2483.5 MHz license free ISM band

Radio Security

AES 128 bit codified

RF Transmitter Power

Max. 11.6 dBm (fixed)

Antenna

+2 dBi Omni directional monopole type

Measurement Range

See Table 10.1

Accuracy

See Table 10.1

Cold Junction Compensation Accuracy

± 0.5°C

Ambient Temperature Effect

See Table 10.2

Battery Pack

Refer to GS 01C50E01-01EN

Update Time

1 to 3600 s selectable*
* Minimum update time is 2 s at dual input sensor use.

Input

Single input: Amplifier housing code 7
Dual input: Amplifier housing code 8 and 9
Input type is selectable: Thermocouples, 2-, 3-, and 4-wire RTDs, ohms and DC milivolts. See Table 10.1.
4-wire is available for Sensor 1 input. See Table 10.1.

Input Signal Source Resistance (for T/C, mV)

1 kΩ or lower

Input Lead Wire Resistance (for RTD, Ohm)

10 Ω per wire or lower

Power Supply Specifications

Battery:
Use the dedicated battery pack.
Rated voltage: 7.2 V
Rated capacity: 19 Ah

Ambient Temperature Limits

- 40 to 85°C (- 40 to 185°F)
- 30 to 80°C (- 22 to 176°F) LCD visible range

Ambient Humidity Limits

0 to 100% RH

Zero-gain Adjustment

Set the amount of zero-gain point adjustment

Integral Indicator (LCD display)

5-digit numerical display, unit display and bar graph. The indicator is configurable to display the following variables periodically.
°C, K, °F, °R, mV and Ω, 0 to 100 % bar graph, and alternate display of Sensor 1 and Sensor 2 process value

Sensor Burnout

Select either HIGH or LOW as the configuration.

Self Diagnostics

Amplifier failure, sensor failure, configuration error, battery alarm, wireless communication alarm and over-range error for process variables.

EMC Conformity Standards

EN61326-1 Class A, Table 2 (For use in industrial locations), EN61326-2-3

R&TTE Conformity Standards CE ⓘ

ETSI EN 300 328, ETSI EN 301 489-17, EN61010-1

• Indoor/Outdoor use

AT	BE	BG	CY	CZ	DK
EE	FI	FR★	DE	GR	HU
IE	IT	LV	LT	LU	MT
NL	PL	PT	RO	SK	SI
ES	SE	GB	IS	LI	NO
CH					

★ Outdoor use limited to 10mW eirp within the band 2454-2483.5 MHz.
Provided that the same shall not apply to use with 0 dBi antenna.
Consult Yokogawa to obtain 0 dBi antenna.

Regulation Conformity of the Wireless Module

• FCC Approval
• IC Approval

Degrees of Protection

IP66/IP67, NEMA4X

Connections

See Model and suffix codes Table

Housing

Low copper cast aluminum alloy with polyurethane, mint-green paint. (Munsell 5.6BG 3.3/2.9 or its equivalent)

Name plate and tag

304 SST tag plate wired onto transmitter.

Weight

2.8 kg (6.2 lb)
Without battery pack and mounting bracket.

Table 10.1 Sensor type, measurement range, and accuracy

Sensor Type		Standard	Measurement Range	Accuracy
T/C	B	IEC584	100 to 300°C (212 to 572°F)	± 5.0°C (± 9.0°F)
			300 to 400°C (572 to 752°F)	± 2.0°C (± 3.6°F)
			400 to 1820°C (752 to 3308°F)	± 1.5°C (± 2.7°F)
	E		-200 to 1000°C (-328 to 1832°F)	± 0.4°C (± 0.8°F)
	J		-200 to 1200°C (-328 to 2192°F)	± 0.5°C (± 0.9°F)
	K		-200 to 1372°C (-328 to 2502°F)	± 0.6°C (± 1.1°F)
	N		-200 to 1300°C (-328 to 2372°F)	± 0.6°C (± 1.1°F)
	R		-50 to 100°C (-58 to 212°F)	± 1.7°C (± 3.1°F)
			100 to 1768°C (212 to 3214°F)	± 0.8°C (± 1.5°F)
	S		-50 to 100°C (-58 to 212°F)	± 1.7°C (± 3.1°F)
			100 to 1768°C (212 to 3214°F)	± 0.8°C (± 1.5°F)
	T		-200 to 400°C (-328 to 752°F)	± 0.5°C (± 0.9°F)
RTD	Pt100	IEC751	-200 to 850°C (-328 to 1562°F)	± 0.3°C (± 0.6°F)
	Pt200		-200 to 850°C (-328 to 1562°F)	± 0.6°C (± 1.1°F)
	Pt500		-200 to 850°C (-328 to 1562°F)	± 0.5°C (± 0.9°F)
mV		-	-10 to 100 [mV]*1 -10 to 220 [mV]*2	± 0.03 [mV]
Ohm		-	0 to 2000 [Ω]	± 1 [Ω]

Note: For T/C input, add Cold Junction Compensation Accuracy (± 0.5°C) to the total accuracy.
For RTD input of the 2-wire connection, add a corrected value (± 0.1°C) to the total accuracy.
*1: Applicable for amplifier housing code 7.
*2: Applicable for amplifier housing code 8 and 9.

Table 10.2 Effects of ambient temperature

Sensor Type		Temperature Effects per 1.0°C Change in Ambient Temperature	Measurement Range
T/C	B	0.2°C - (0.066% of (t - 100))	100°C ≤ t < 300°C
		0.07°C - (0.0057% of (t - 300))	300°C ≤ t < 1000°C
		0.037°C	t ≥ 1000°C
	E	0.0035°C - (0.00492% of t)	t < 0°C
		0.0035°C + (0.00146% of t)	t ≥ 0°C
	J	0.0039°C - (0.00529% of t)	t < 0°C
		0.0039°C + (0.00149% of t)	t ≥ 0°C
	K	0.00521°C - (0.00707% of t)	t < 0°C
		0.00521°C + (0.00182% of t)	t ≥ 0°C
	N	0.0077°C - (0.00918% of t)	t < 0°C
		0.0077°C + (0.00136% of t)	t ≥ 0°C
	R, S	0.04°C - (0.057% of t)	t < 0°C
		0.04°C + (0.0102% of t)	0°C ≤ t < 100°C
		0.0316°C - (0.001% of t)	100°C ≤ t < 600°C
		0.0175°C + (0.00173% of t)	t ≥ 600°C
	T	0.00513°C - (0.00631% of t)	t < 0°C
		0.00513°C + (0.0008% of t)	t ≥ 0°C
RTD	Pt100	0.0048°C + (0.0016% of absolute value t)	Entire Sensor Input Range
	Pt200	0.0038°C + (0.0015% of absolute value t)	t < 650°C
		0.0028°C + (0.0016% of t)	t ≥ 650°C
	Pt500	0.003°C + (0.0014% of absolute value t)	t < 650°C
		0.002°C + (0.0016% of t)	t ≥ 650°C
mV		0.2μV + (0.0015% of reading)	Entire Sensor Input Range
Ohm		0.001Ω + (0.0011% of reading)	Entire Sensor Input Range

Note1: The “t” on Table 10.2 means the value of the reading in °C.
Note2: The “absolute value t” on Table 10.2 means the absolute value of the reading in °C.
[Example of absolute value t]
When the temperature value is 250 Kelvin, abs reading is 23.15, absolute (250 - 273.15).

10.2 Model and Suffix Codes

Model	Suffix Codes	Descriptions
YTA510	. . . . .	Temperature Transmitter
Output Signal	**-L**	Wireless communication (ISA100.11a)
Amplifier Housing	**7**	Single input type, cast aluminum alloy with integral antenna
	8	Dual input type, cast aluminum alloy with detachable antenna (2 dBi)*3
	9	Dual input type, cast aluminum alloy without antenna (N connector)*2*3
Electrical Connection	**0**	G 1/2 female, two electrical connections without bilnd plugs
	2	1/2 NPT female, two electrical connections without bilnd plugs
	4	M20 female, two electrical connections without bilnd plugs
	5	G 1/2 female, two electrical connections with a bilnd plug
	7	1/2 NPT female, two electrical connections with a bilnd plug
	9	M20 female, two electrical connections with a bilnd plug
	A	G 1/2 female, two electrical connections with a SUS316 bilnd plug
	C	1/2 NPT female, two electrical connections with a SUS316 bilnd plug
	D	M20 female, two electrical connections with a SUS316 bilnd plug
Integral Indicator	**D**	with digital indicator
Mounting Bracket	**B**	SUS304 stainless steel 2-inch horizontal pipe mounting bracket *1
	D	SUS304 stainless steel 2-inch vertical pipe mounting bracket *1
	J	SUS316 stainless steel 2-inch horizontal pipe mounting bracket *1
	K	SUS316 stainless steel 2-inch vertical pipe mounting bracket *1
	N	None
---	**A**	Always A
---	**A**	Always A
Option codes	/☐ Optional specifications	

*1: For flat-panel mounting, please prepare bolts and nuts.
*2: Order the antenna separately from accessary option.
*3: Remote antenna cables can be attached. Order separately from accessary option.

10.3 Optional Specification

Item	Description		Code
Painting	Color change	Amplifier cover only Munsell code; N1.5, black	**P☐**
	Coating change	High anti-corrosion coating	**X2**
Calibration unit	°F or °R		**D2**

Table A. Settings upon shipment

Tag No.	“Blank” or as specified in order
Calibration range and unit	See Table 10.1. Measurement Range or as specified in order

10.4 Optional Specifications (For Explosion Protected type)

Item	Description	Code
Factory Mutual (FM)	FM Intrinsically safe,non-incendive Approval Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G and Class III, Division 1, Class I, Zone 0, in Hazardous Locations, AEx ia IIC Nonincendive for Class I, Division 2, Groups A, B, C & D, Class II, Division. 2, Groups F & G, and Class III, Division 1, Class I, Zone 2, Group IIC, in Hazardous Locations Sensor Circuit Parameter: Voc=6.6V, Isc=48mA, Po=78mW, Ca=5µF, La=30mH	**FS17**
Canadian Standards Association (CSA)	CSA Intrinsically safe Approval [For CSA C22.2] Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G, Class III, Division 1, Nonincendive for Class I, Division 2, Groups A, B, C & D, Class II, Division 2, Groups F & G, Class III, Division 1 [For CSA E60079] Ex ia II C T4 Sensor Circuit Parameter: Uo=6.6V, Io=48mA, Po=78mW, Co=5µF, Lo=30mH	**CS17**
ATEX	ATEX Intrinsically safe Approval II 1G Ex ia IIC T4 Ga Sensor Circuit Parameter: Uo=6.6V, Io=48mA, Po=78mW, Co=5µF, Lo=30mH	**KS27**
IECEx	IECEx Intrinsically safe Approval Ex ia IIC T4 Ga Sensor Circuit Parameter: Uo=6.6V, Io=48mA, Po=78mW, Co=5µF, Lo=30mH	**SS27**

■ Optional Accessories

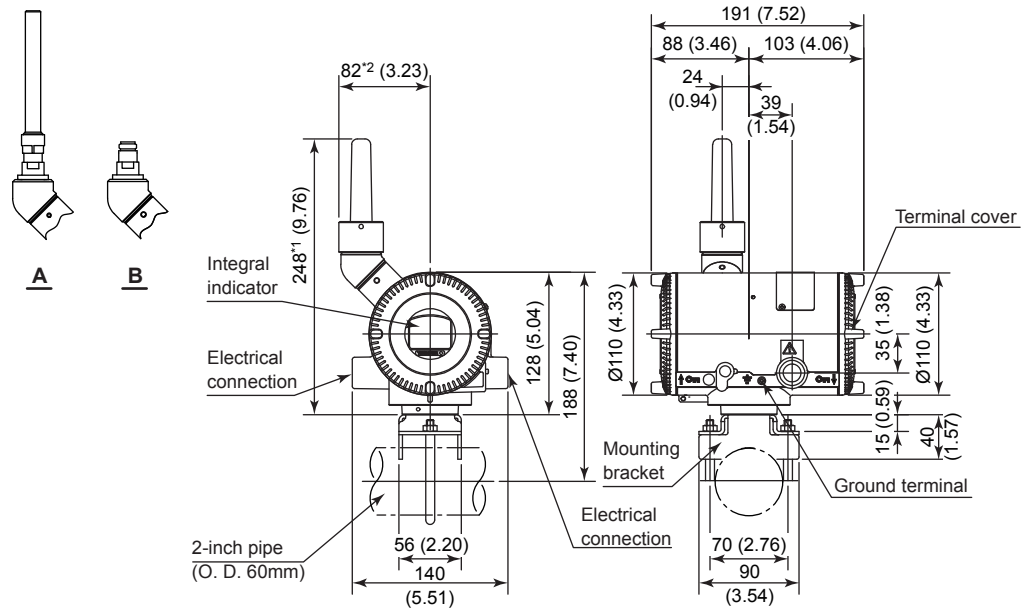
Product	Part number	Specification
Battery pack assembly	F9915NQ	Battery case, Lithium-thionyl chloride batteries 2 pieces
Batteries*1	F9915NR	Lithium-thionyl chloride batteries, 2 pieces
Battery case	F9915NK	Battery case only
Remote antenna cable	F9915KU	3 m with mounting bracket
	F9915KV	13 m (3 m+10 m), with arrester and mounting bracket
Antenna	F9915KW	2 dBi standard antenna
	F9915KX	0 dBi antenna
	F9915KY	6 dBi high gain antenna*2

*1: Alternatively, Tadiran SL-2780/S or TL-5930/S batteries can be purchased from your local distributer.
*2: Use of high gain antenna is limited by local regulation of radio and telecommunication law. Consult Yokogawa for details. High gain antenna must be connected to the transmitter by using remote antenna cables.

10.5 Dimensions

● 2-inch horizontal pipe mounting (Amplifier housing code 7)

Unit: mm (approx. inch)



*1: When amplifier housing code 8 is selected, the value is 307 mm (12.09 inch). When amplifier housing code 9 is selected, the value is 187 mm (7.36 inch). In both cases, the figures are shown as A or B accordingly.
*2: When ampilfier housing code 8 or 9 is selected, the value is 81 mm.

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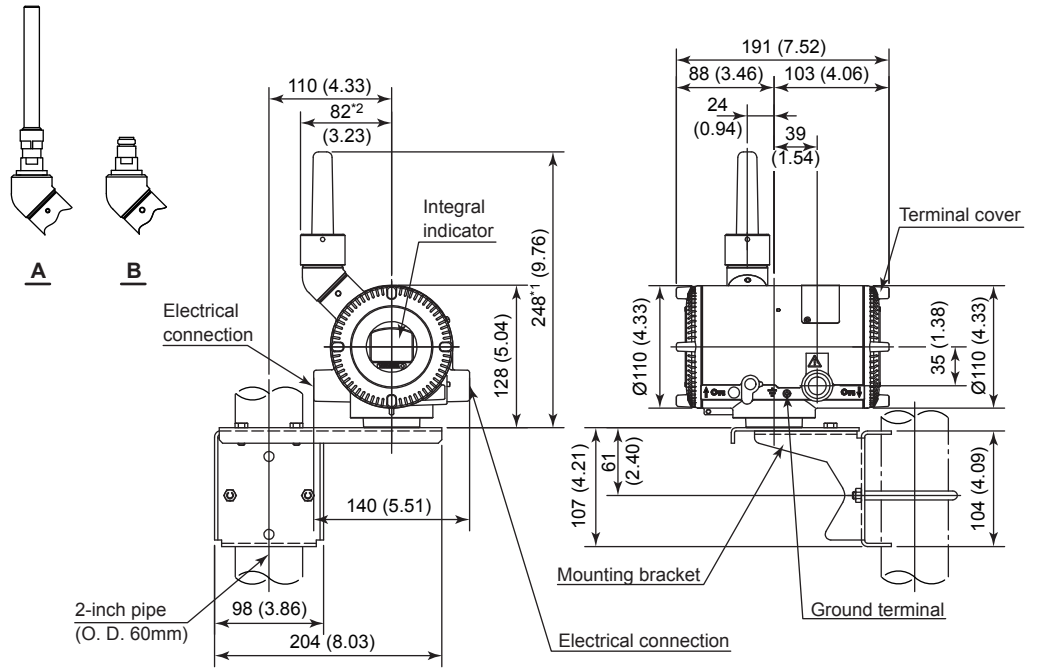
● 2-inch vertical pipe mounting (Amplifier housing code 7)

Unit: mm (approx. inch)



*1: When amplifier housing code 8 is selected, the value is 307 mm (12.09 inch). When amplifier housing code 9 is selected, the value is 187 mm (7.36 inch). In both cases, the figures are shown as A or B accordingly.
*2: When ampilfier housing code 8 or 9 is selected, the value is 81 mm (3.19 inch).

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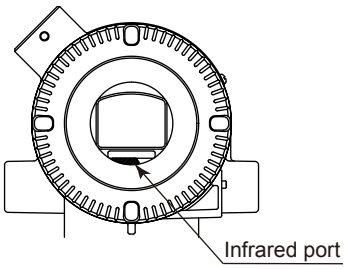
● Infrared Configuration



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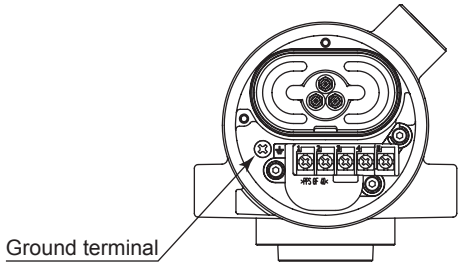
● Terminal Configuration



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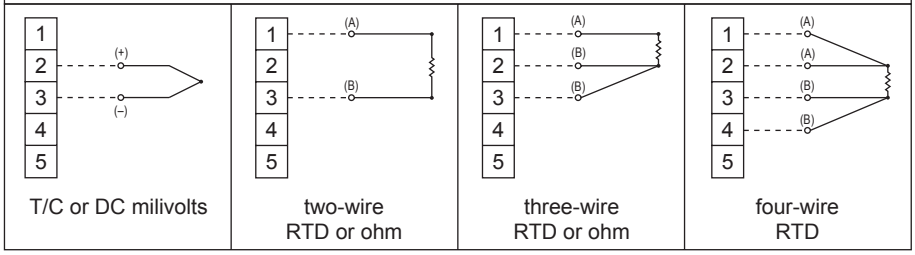
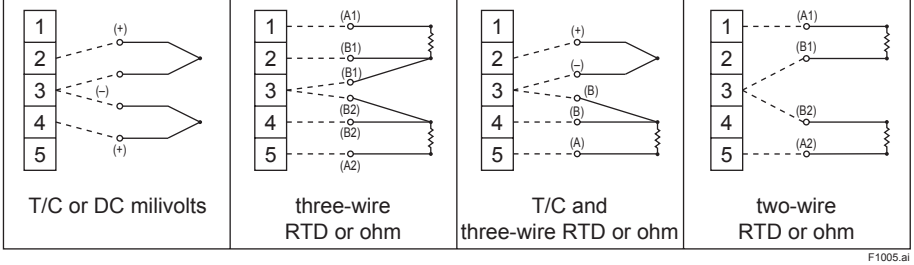
● Input Wiring

Single input



Dual input (Amplifier housing code 8 and 9)



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Revision Information

- Title : YTA510
  Temperature Transmitter
- Manual No. : IM 01C50E01-01EN

Edition	Date	Page	Revised Item
1st	Aug. 2010	—	New publication
2nd	Oct. 2010	2 - 5 2 - 7 10 - 4	2.7.3 Add CENELEC ATEX (KEMA) Certification 2.7.4 Add IECEx Certification 10.4 Add option code /KC27 and /SS27.
3rd	Apr. 2011	—	• Adapted to device configuration tool with infrared communication function. • Part number change Battery pack: F9915MA → F9915NQ Delete F9915MX Battery: A1133EB → F9915NR Delete battery case part number
4th	Dec. 2011	8-5	8.4.6 Add battery case part number of F9915NK.
5th	Aug. 2012	—	Release of amplifier housing code 8 and 9.